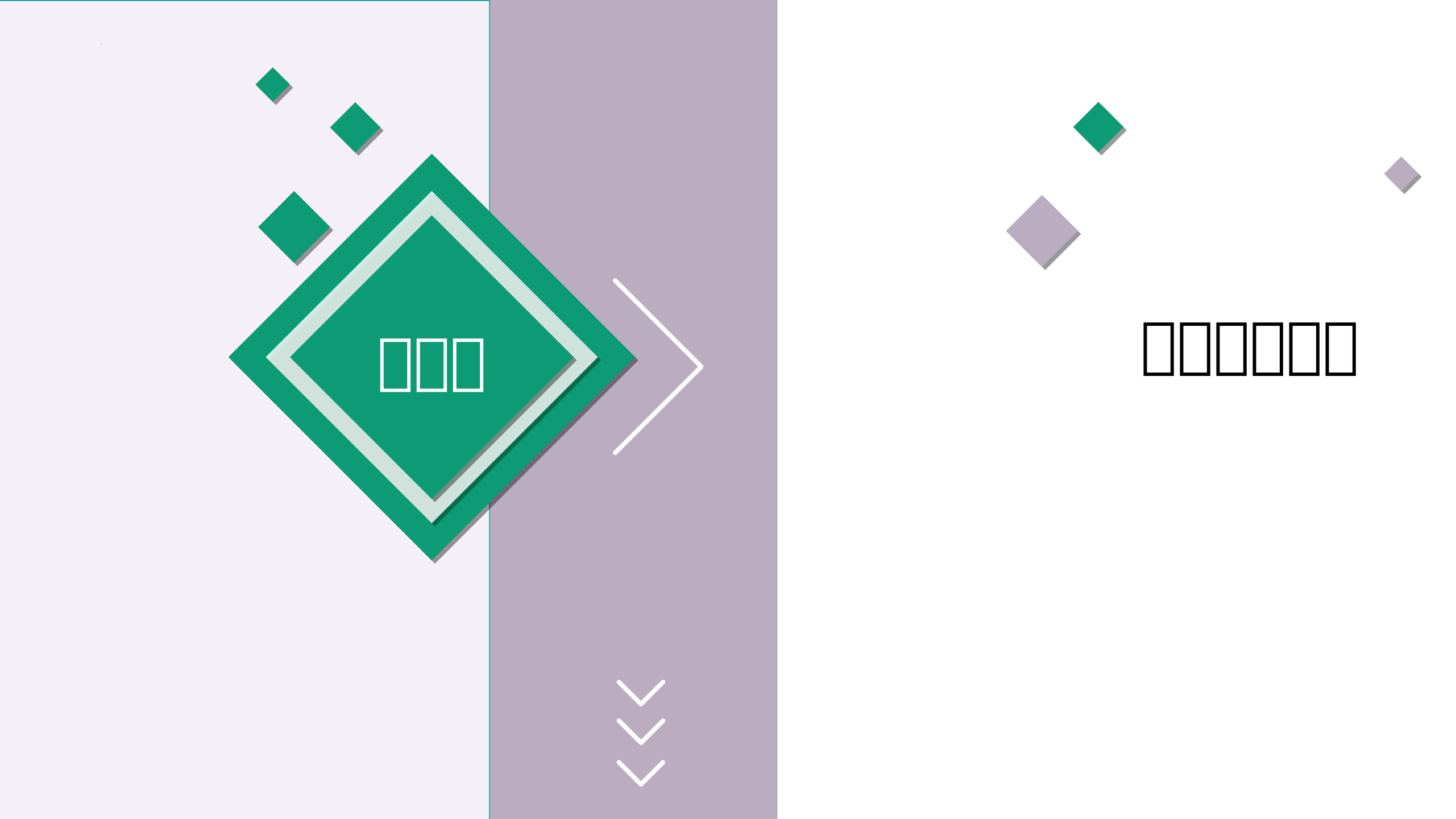
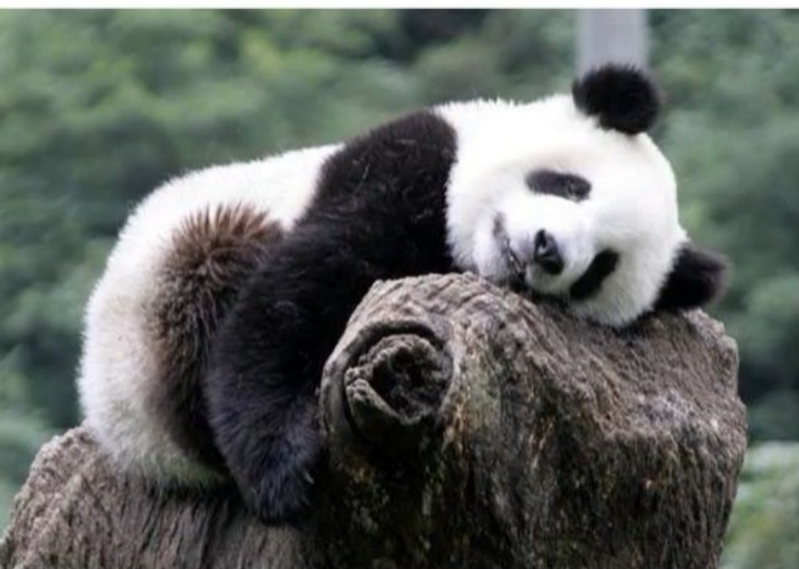
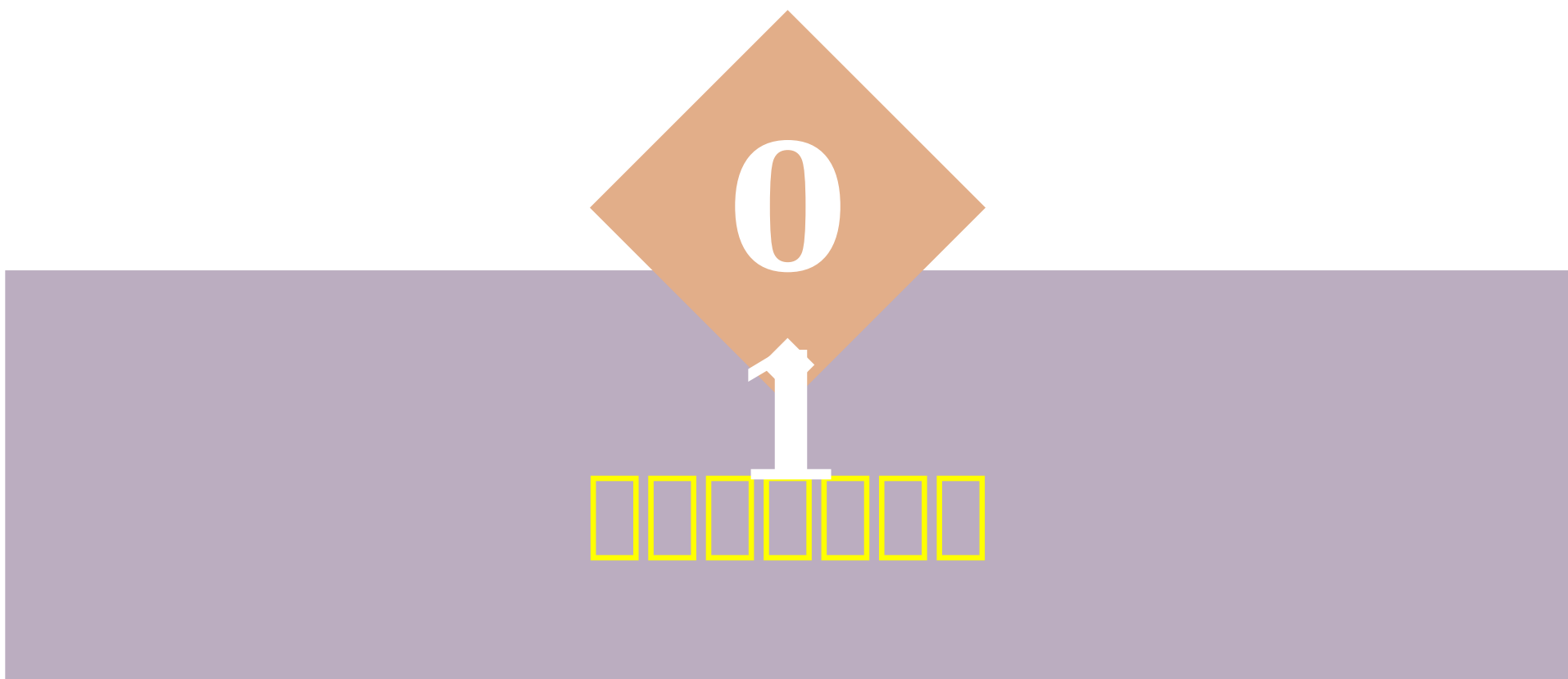






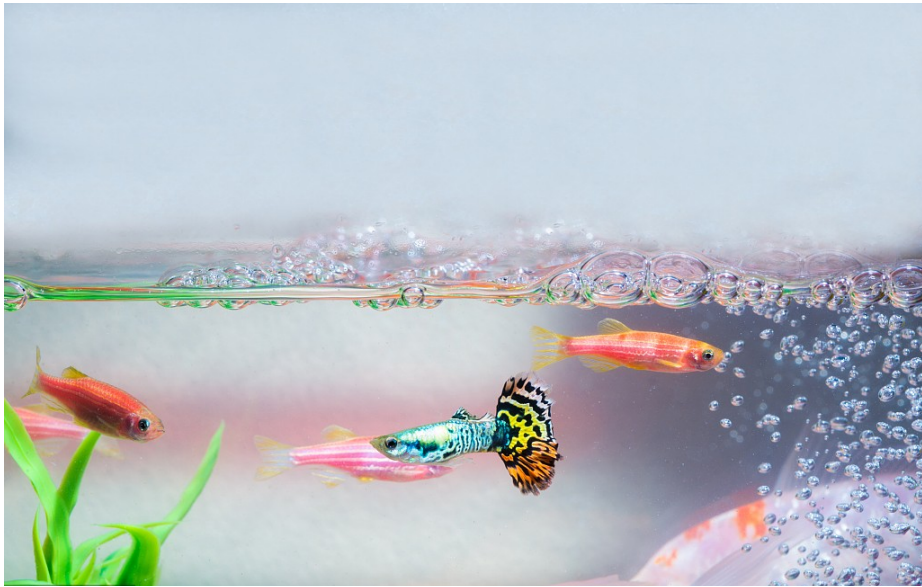
种群研究的中心问题是**种群的数量特征及其变化规律**



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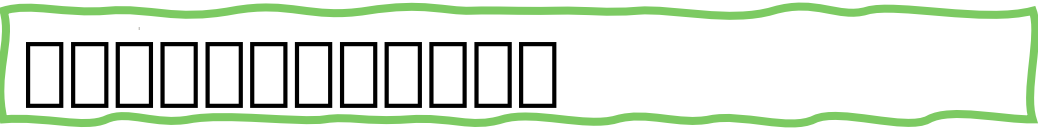
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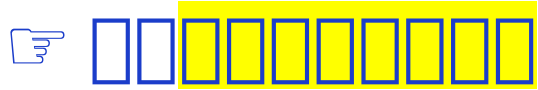
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数量现状

→ 种群密度



种群数量发展趋势

→ 性别比例

→ 出生率和死亡率

→ 迁入率和迁出率

→ 年龄组成



种群数量特征



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□ 2 □□□□□□□□□□



小老虎和猎人故事

一天，他在追捕猎物时

濒危动物保护



有害生物防治

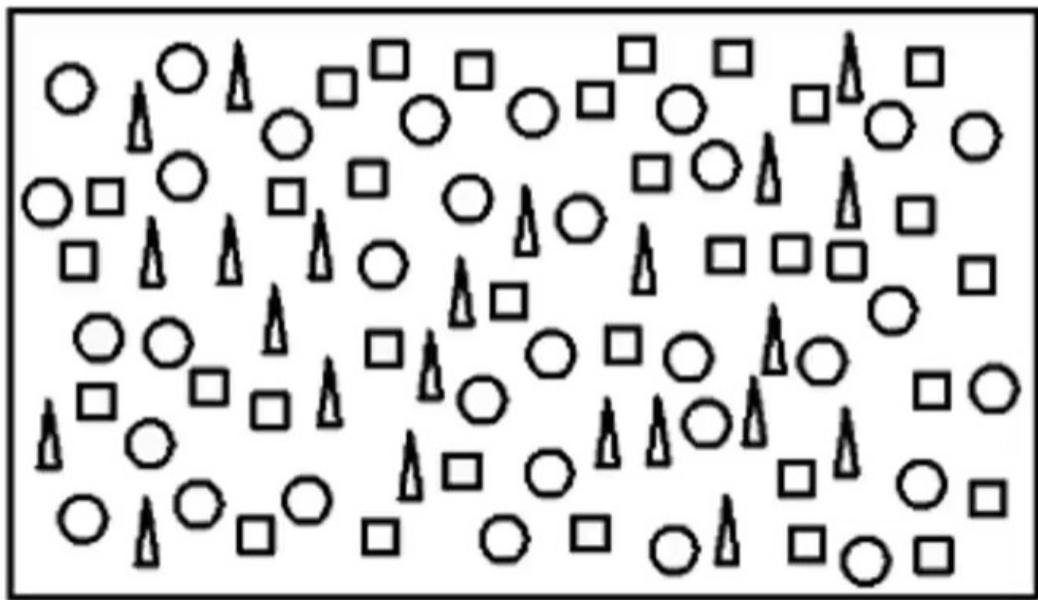


渔业上合理捕捞量

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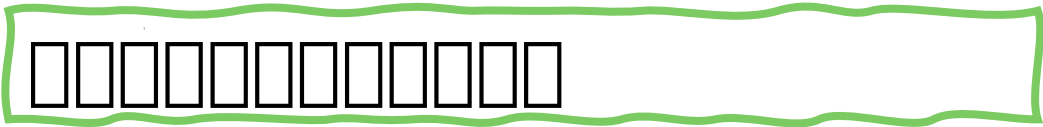
下列草地 (5m^2)，其中0代表加拿大一枝黄花。则种群密度为 6.4 株/ m^2 ，如果是 5000m^2 还能这样调查吗？ ____



逐个计数法

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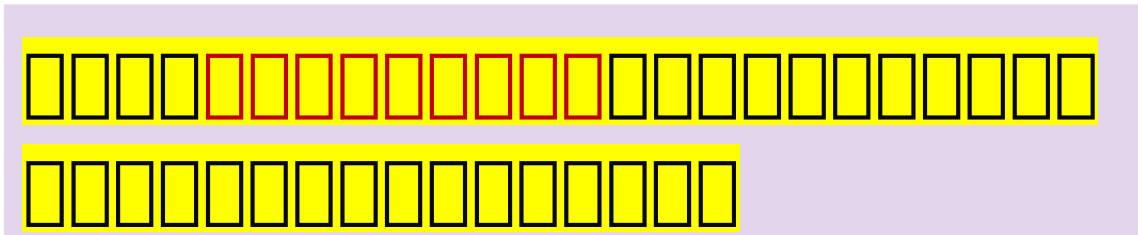
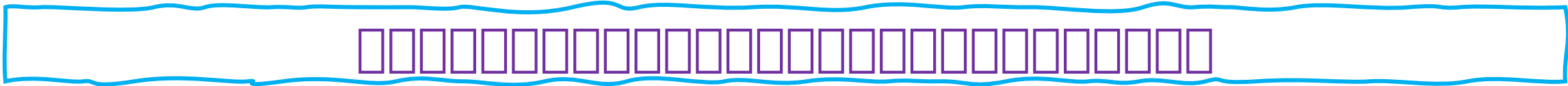
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1

在调查分布范围较小、个体较大的种群时，可以逐个计数。



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2. □□□□□□□□

□ 2 □□□

在多数情况下，逐个计数非常困难，需要采取估算的方法。



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④ □□□□□

① □□□



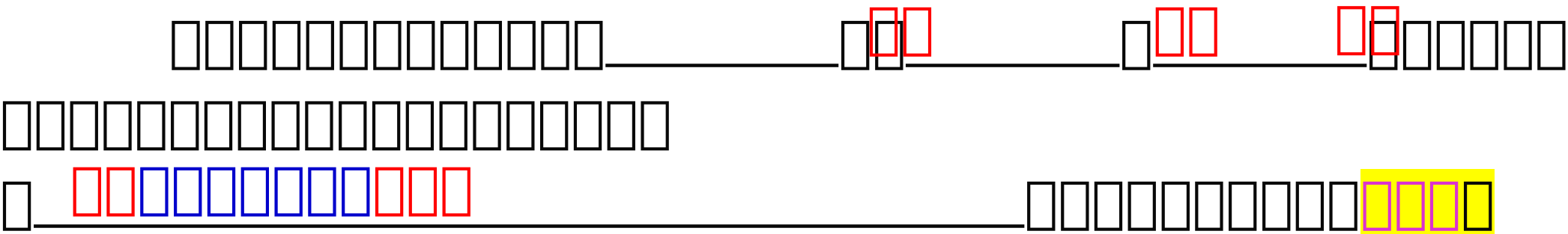
【实例】某同学对某地蒲公英数量调查结果如下（样方面积大小为 1m^2 ），则该地蒲公英的种群密度约为10株/ m^2 。

样方编号	1	2	3	4	5
株数	3	11	8	12	16

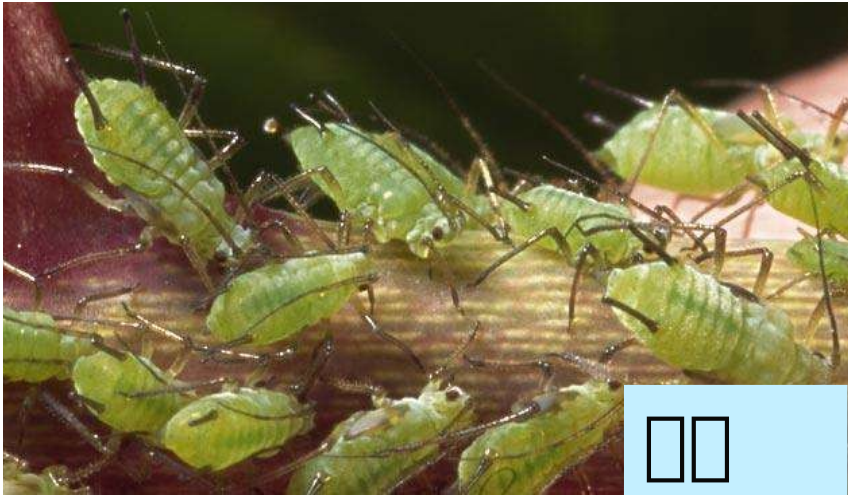
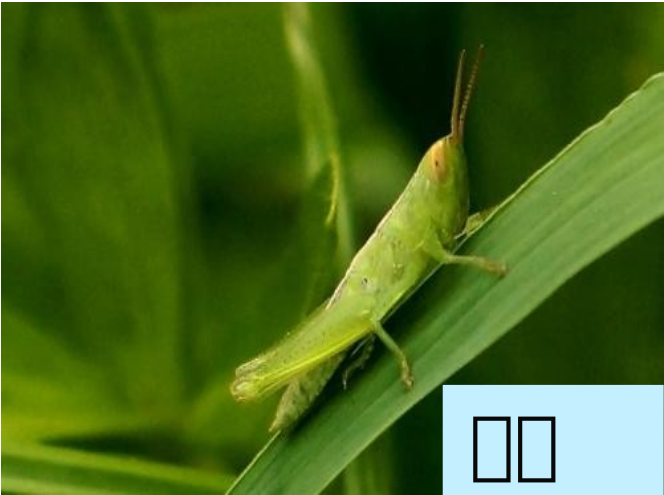
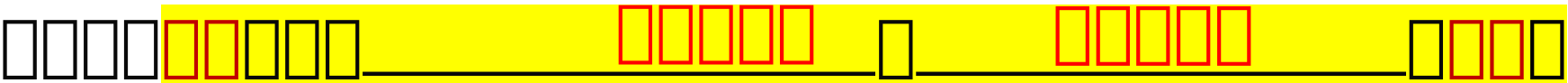
取样关键： □□□□

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B. □□□□





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1. 调查对象： 双 子叶植物



平行脉



网状脉



©西部风貌

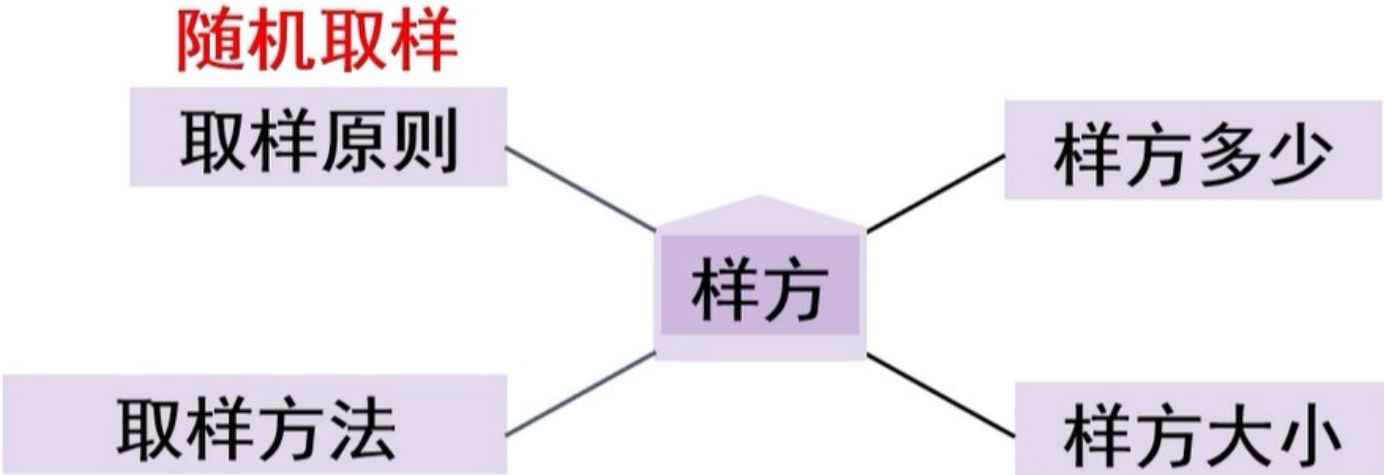
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2. 确定样方：

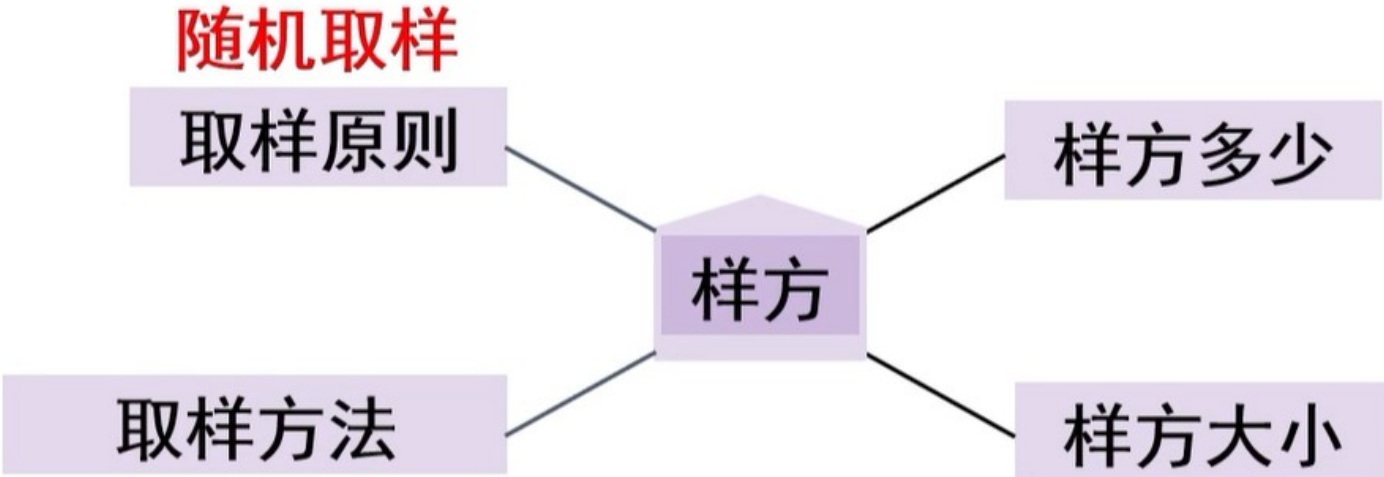


(1) 样方的多少

样方的多少与被调查地段的总面积呈 □ 相关；一般来说，选取的样方越少，□□□□；选取的样方越多，求得的种群密度 □□□□□□。



2. 确定样方：



(2) 样方的大小



草本

样方面积 1m^2



灌木

样方面积 9m^2



乔木

样方面积 100m^2



(3) 常用取样方法:

调查总体为非长条形时

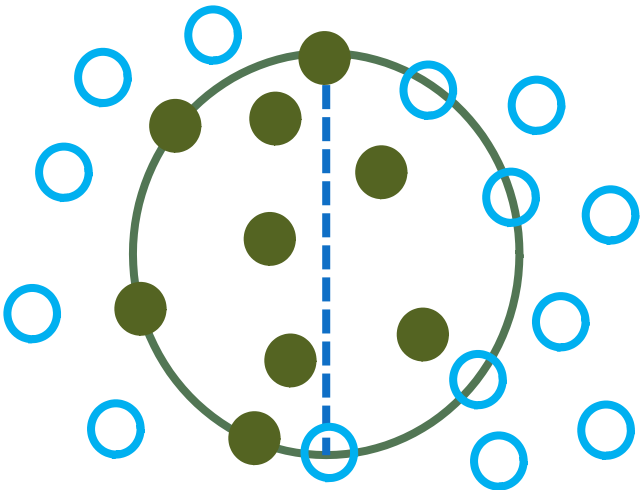
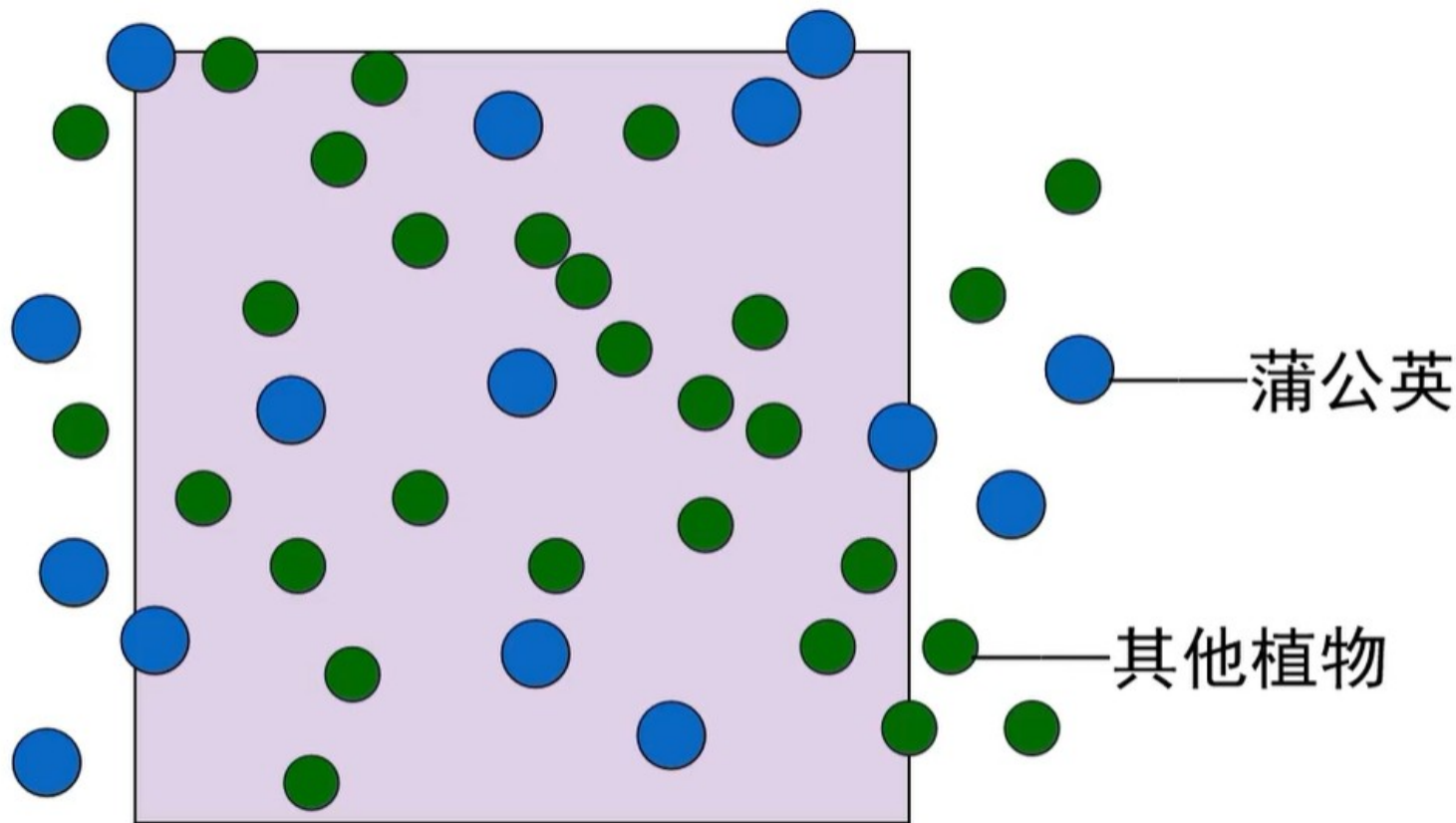
所选样方位置上有块大石头，需要换个位置取样吗？

调查总体为长条形时

不需要



3. 计数： 样方内+相邻**两边**上(计上不计下, 计左不计右)



该样方中有 9 株蒲公英

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A. □□□□

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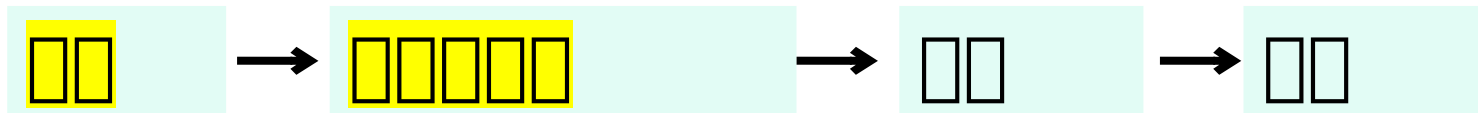


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□□□□□□ 13 □



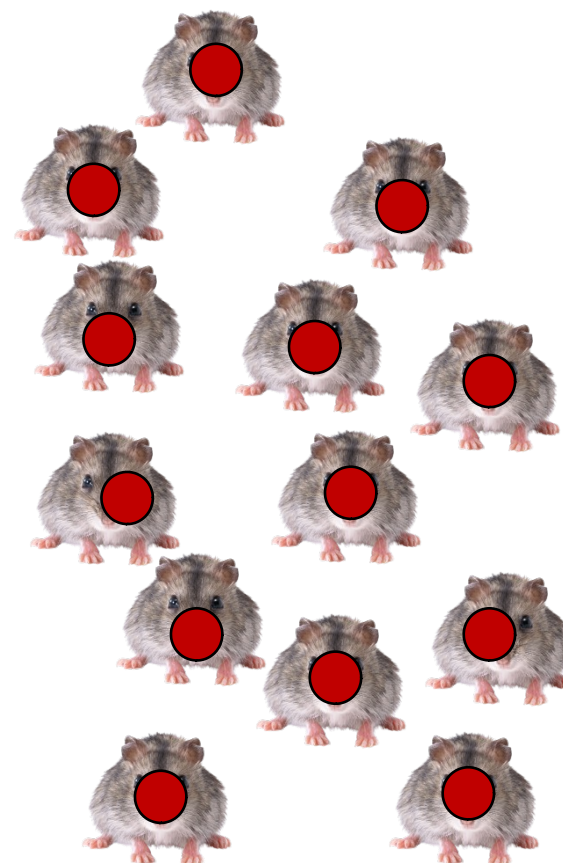
□□□□□ **1hm²**



□□□□□□ 13 □



□□□□□ **1hm²**







□□□□□ 1hm²

□□□□□□ 13 □

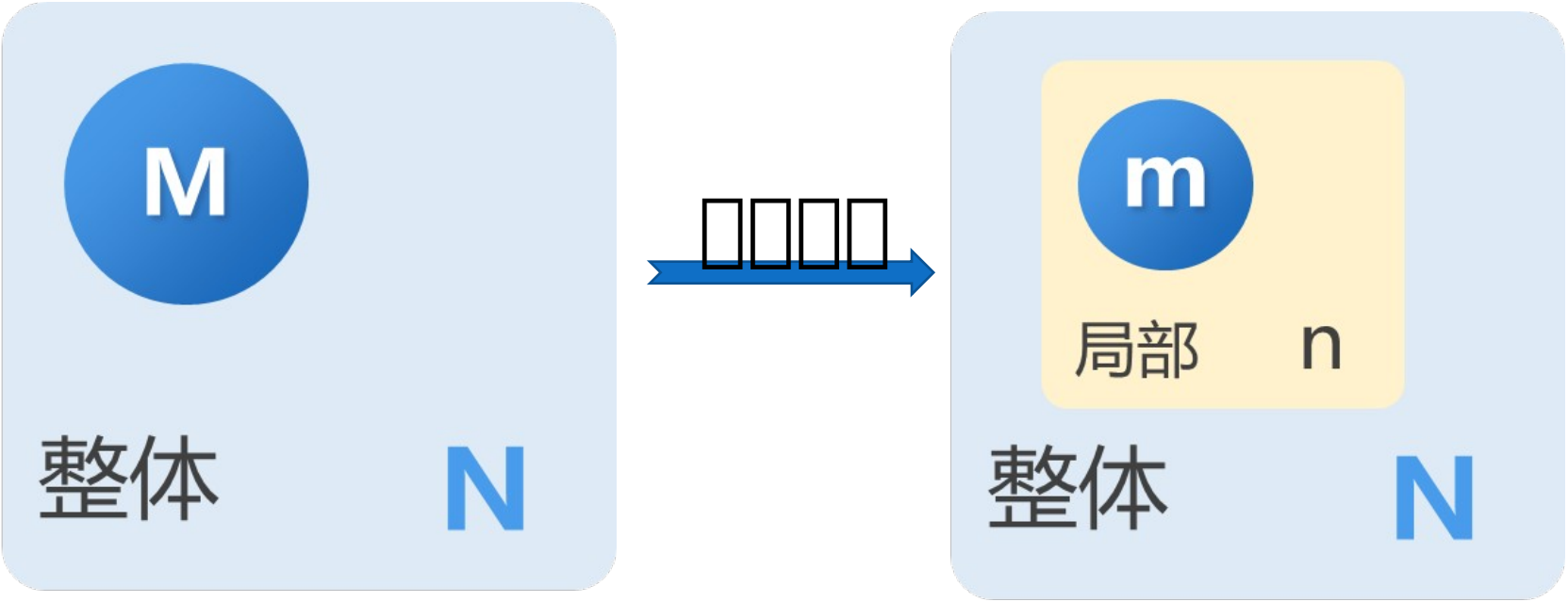
□□□□□□ 14 □

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3/14 □□□□□□

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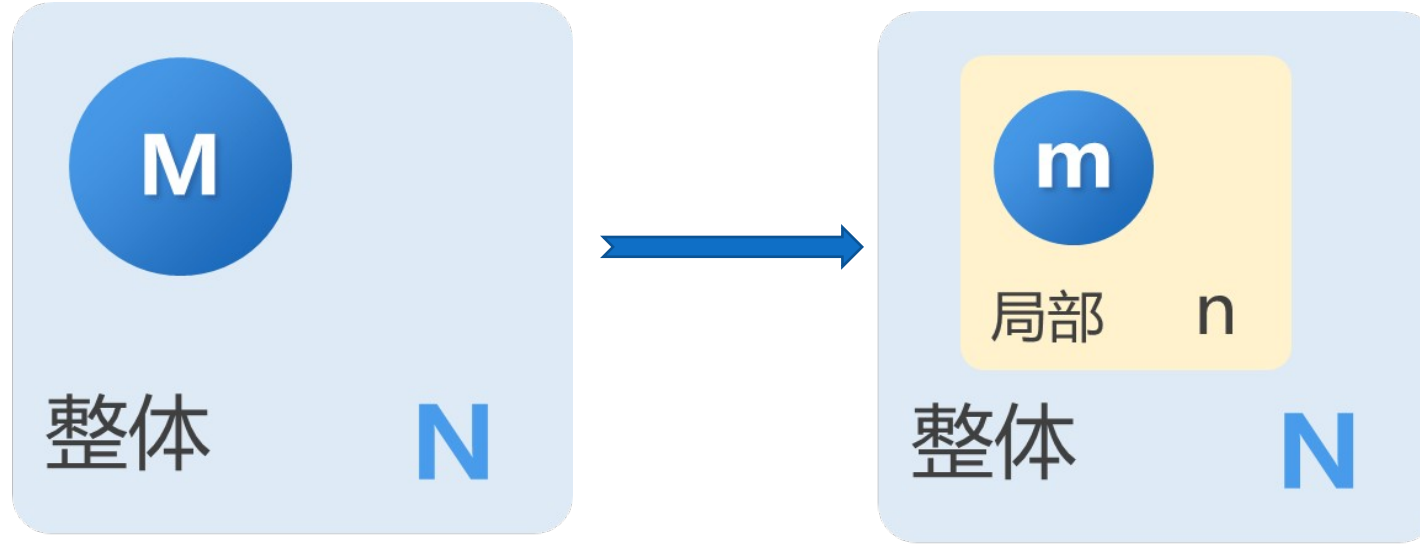


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B. □□□□

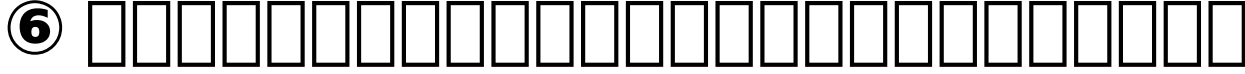
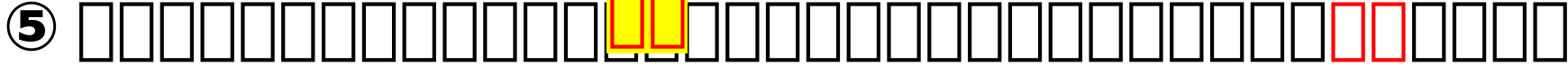
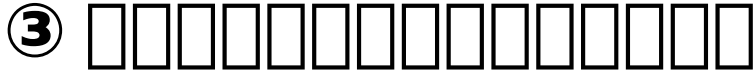
$$\frac{\begin{array}{c} \text{□□} \text{□□□} \text{ (M)} \\ \hline \text{□□□□} \text{ (N)} \end{array}}{\quad} = \frac{\begin{array}{c} \text{□□} \text{□□□□} \text{ (m)} \\ \hline \text{□□} \text{□□} \text{ (n)} \end{array}}$$

C. □□□□□□

a. 标记物不易脱落

b. 不影响被标记生物的正常生理活动

c. 标记物不能过于醒目





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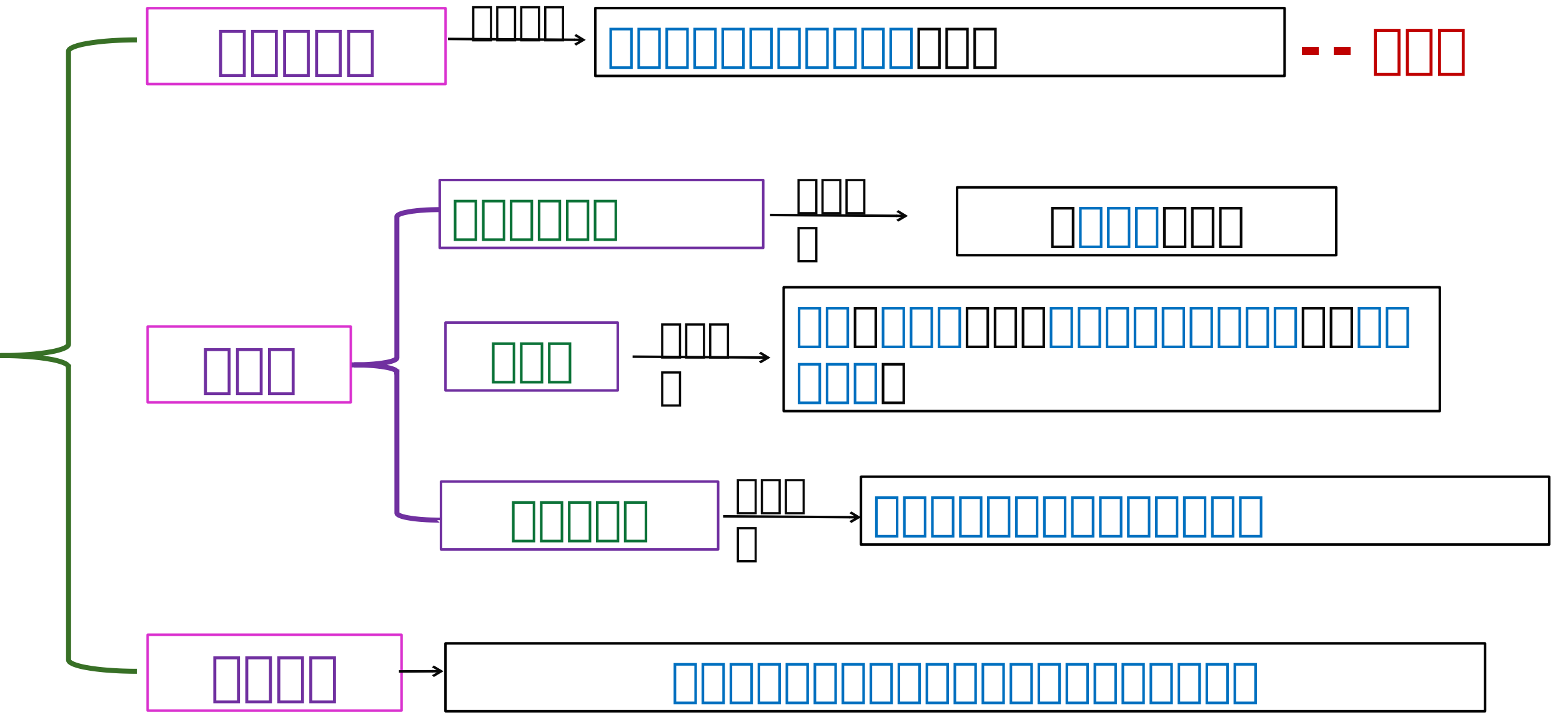
②

Diagram 2 shows a number line from 0 to 10. The first five units (0-5) are marked with vertical lines. The next two units (5-7) are marked with vertical lines and have red boxes above them. The last three units (7-10) are marked with vertical lines. A horizontal line connects the 5th and 7th marks.

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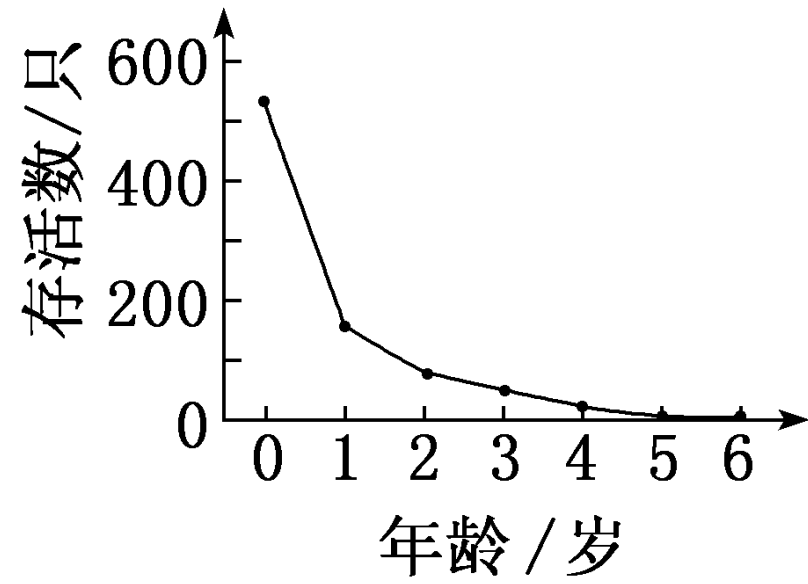
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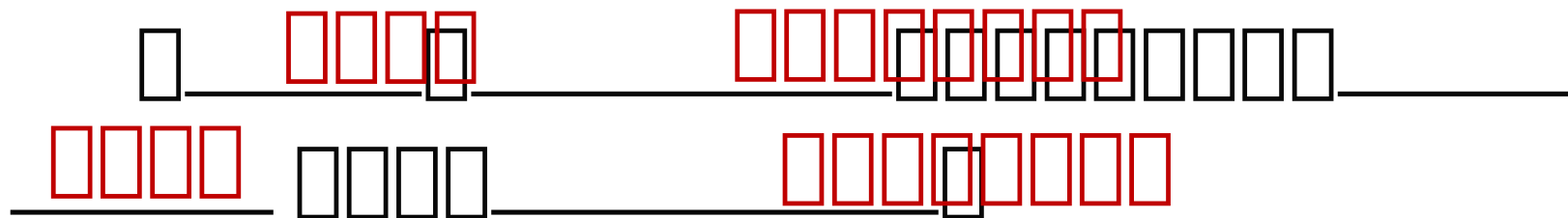
C. □□□□□□□□□□□□□□□□□□

D. □□□□□□□□□□□□□□□□



[illegible]

1.00



2. □□

2015 年 13.7 年

2015 年 1655 年 _____

2015 年 975 人

$$\frac{1655 \text{ } \square}{13.7 \text{ } \square} \times 100\% = \textcolor{red}{i}$$

$$\frac{975 \text{ g}}{13.7 \text{ g}} \times 100\% = 71.2\%$$

12
%
7
%

3. □□

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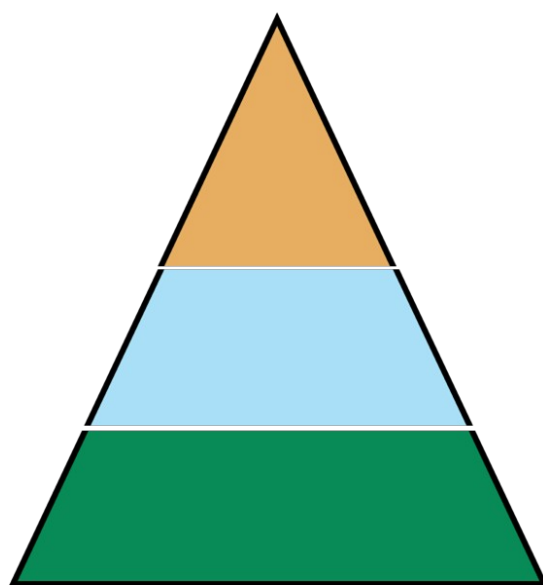
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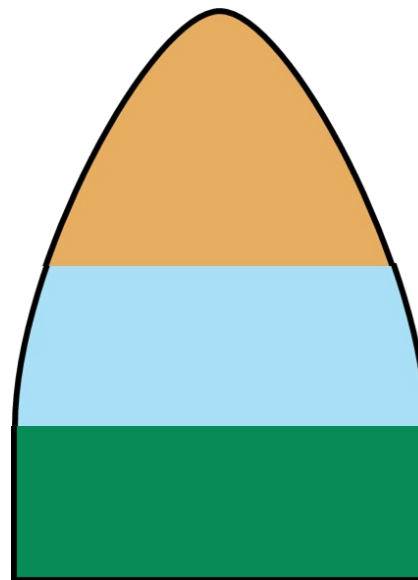
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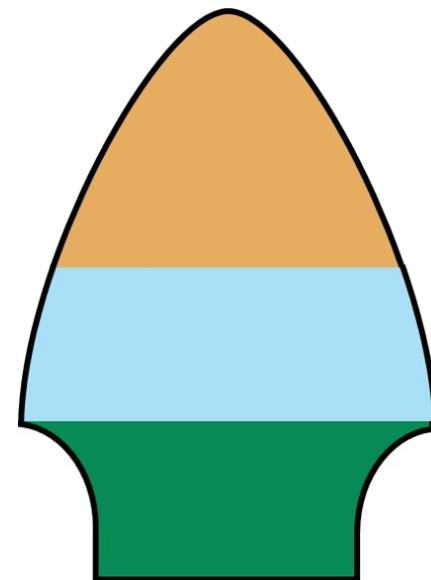
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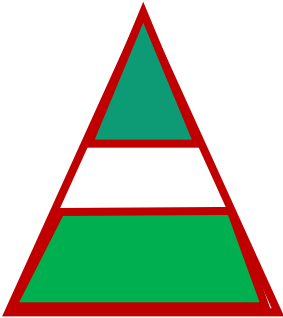
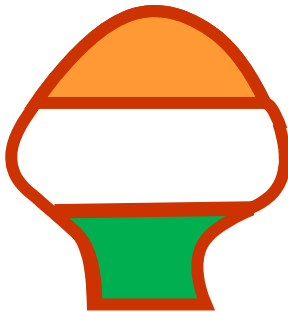
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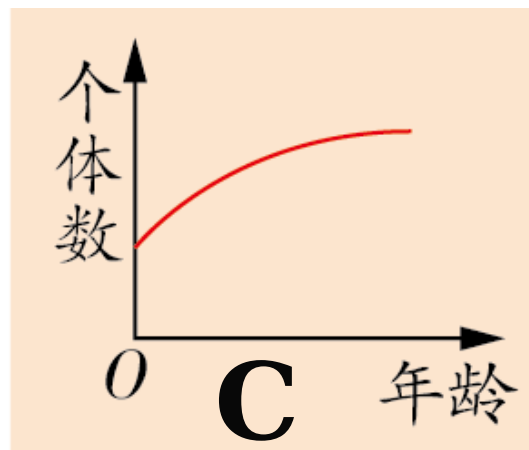
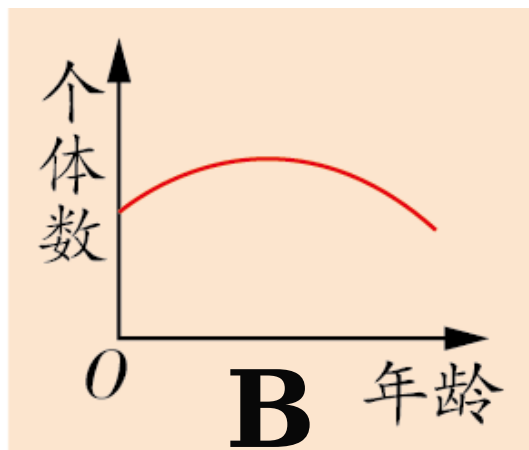
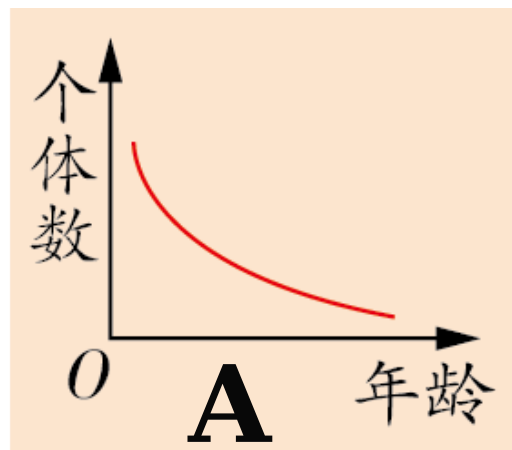
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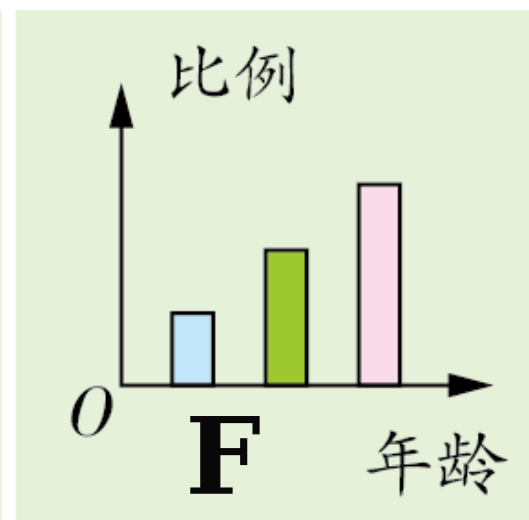
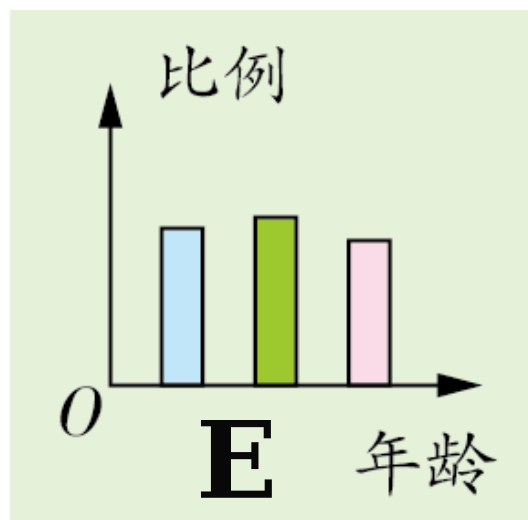
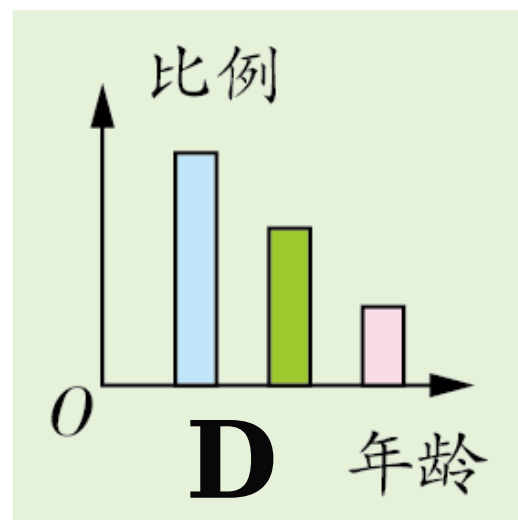
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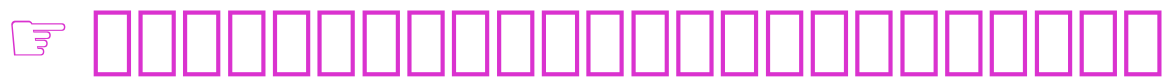
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2. 問題



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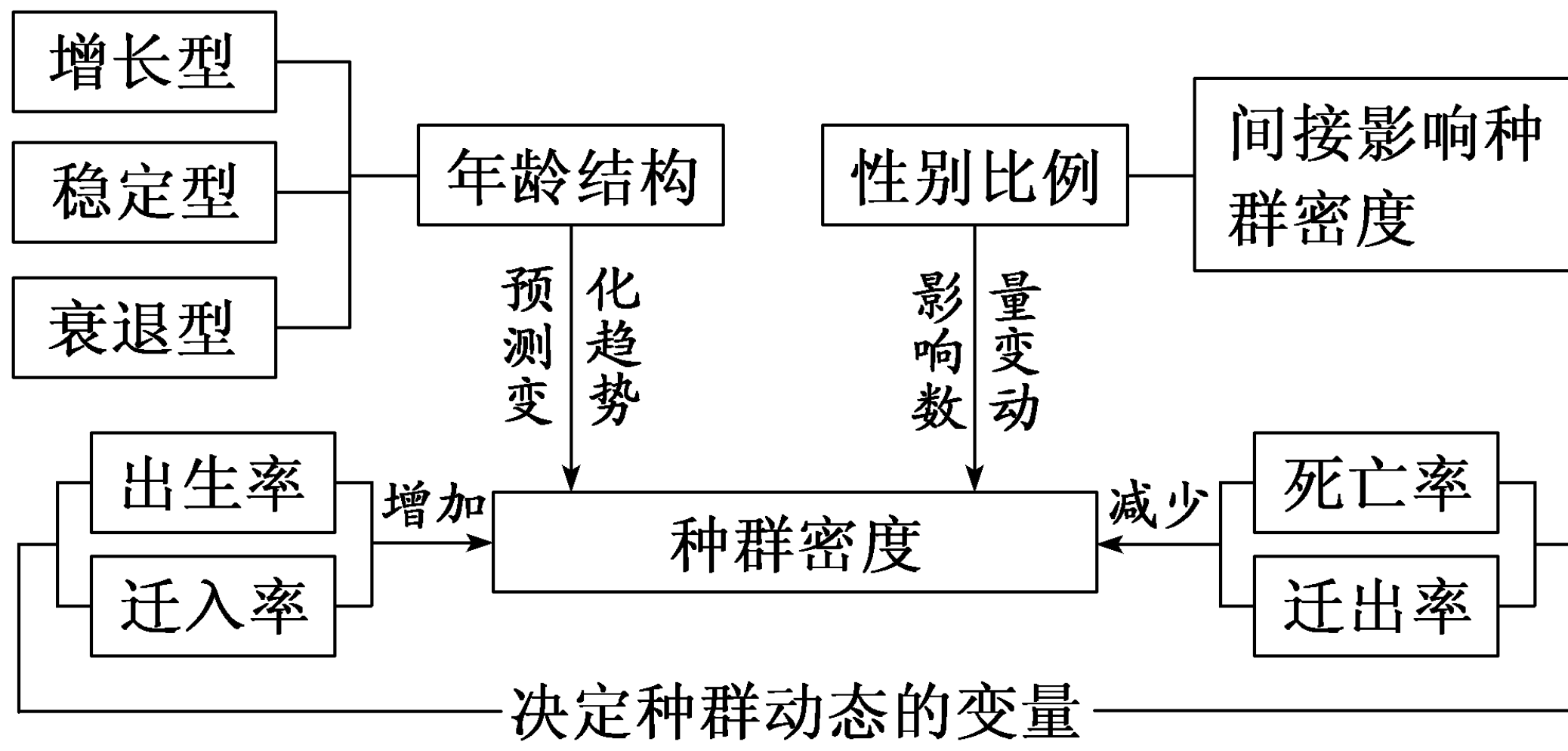
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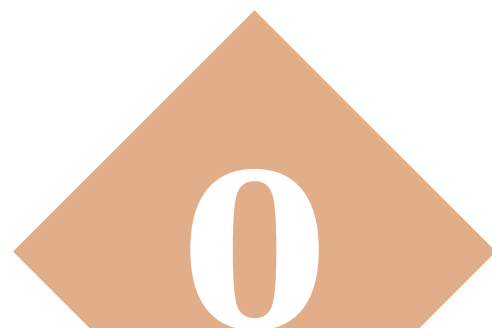
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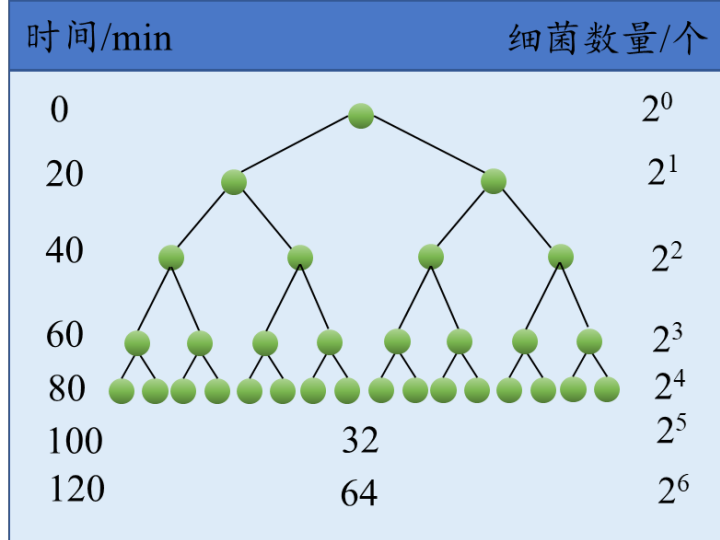




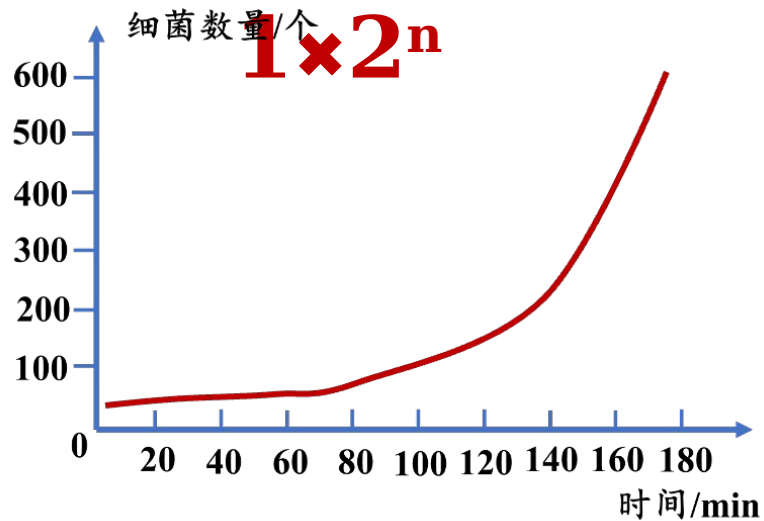
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$$N_n =$$





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□□□ 20min □□□□□□□□□□
□ n □□□□□

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$N_n = 2^n$ N □□□□□□□ n
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□□



1. 如何“J” 数据

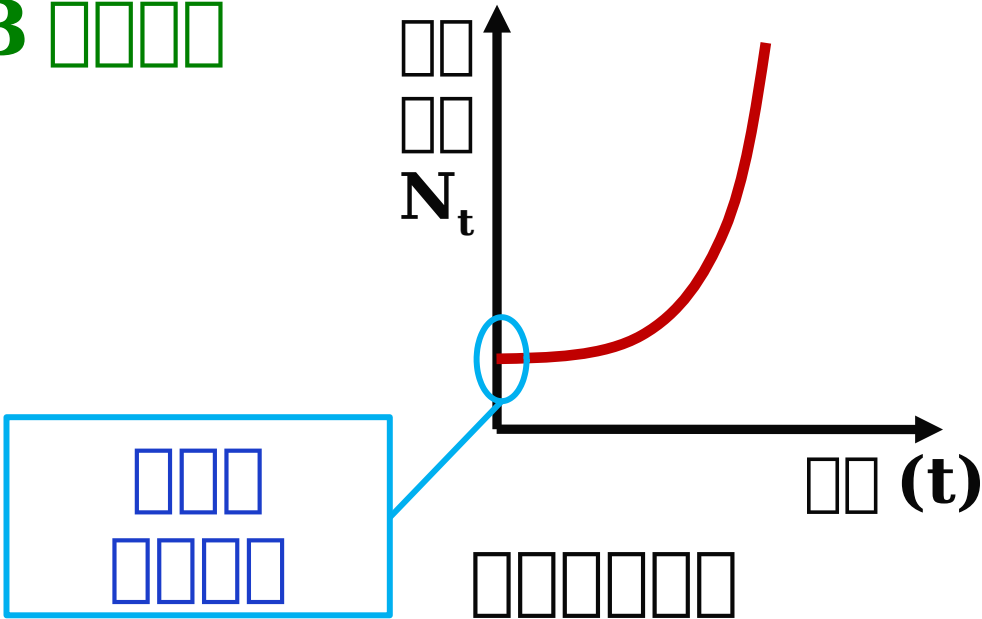
1

$$\square \quad 2 \quad \square \square \square \quad \mathbf{N_t = N_0}$$

☐ 3 ☐☐☐☐

Diagram illustrating a 1D lattice structure with four rows of sites:

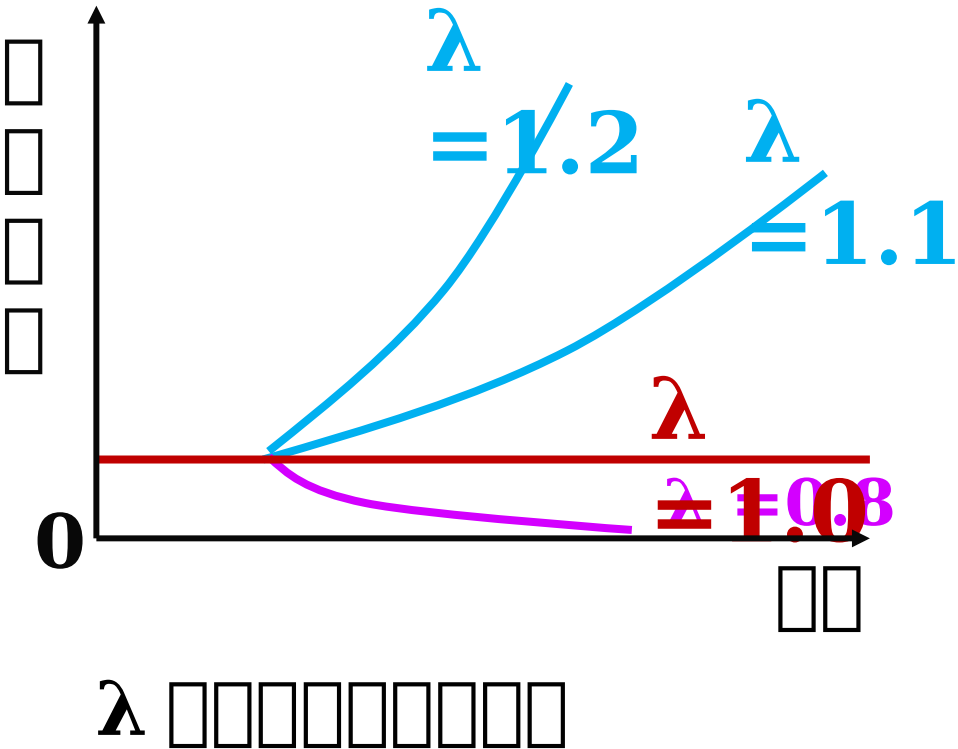
- Top row: Two sites labeled t .
- Second row: Two sites labeled N_t and eight sites labeled t .
- Third row: Four sites labeled N_0 .
- Bottom row: Sixteen sites labeled λ .



1. “J” — $N_t = N_0 \lambda^t$

4 λ

$\lambda > 1$		
$\lambda = 1$		
$\lambda < 1$		
$\lambda = 0$		



λ = 1 “J”

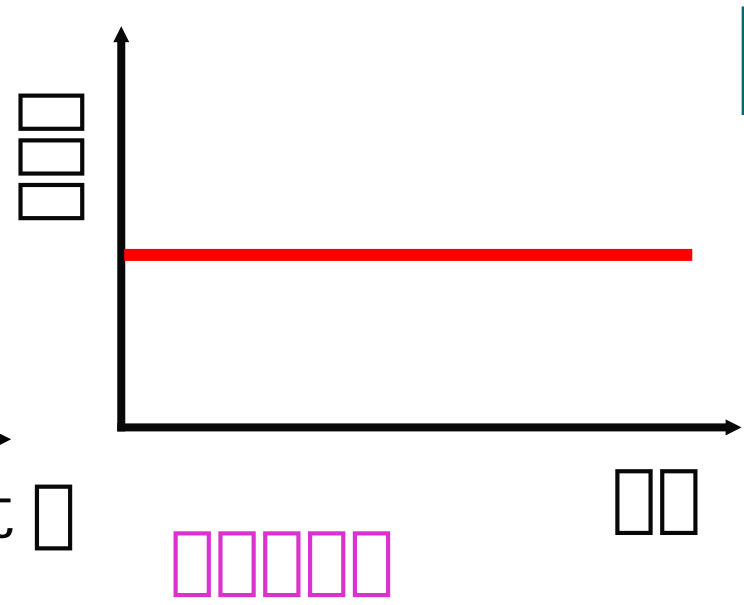
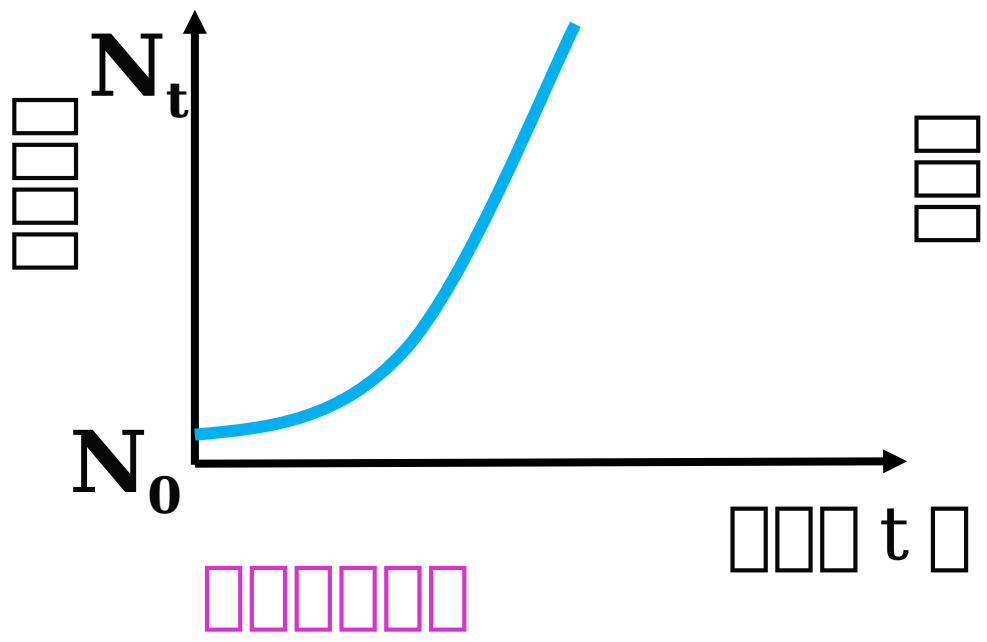
λ = 1 “J”

1. “J” — $N_t = N_0 \lambda^t$

5

①

$$= \text{ } - \text{ } / \text{ }$$

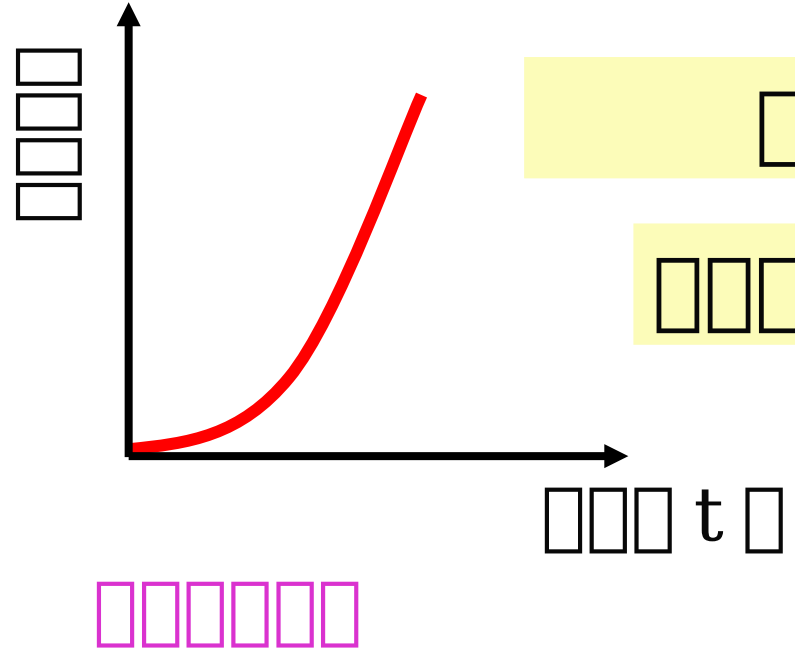
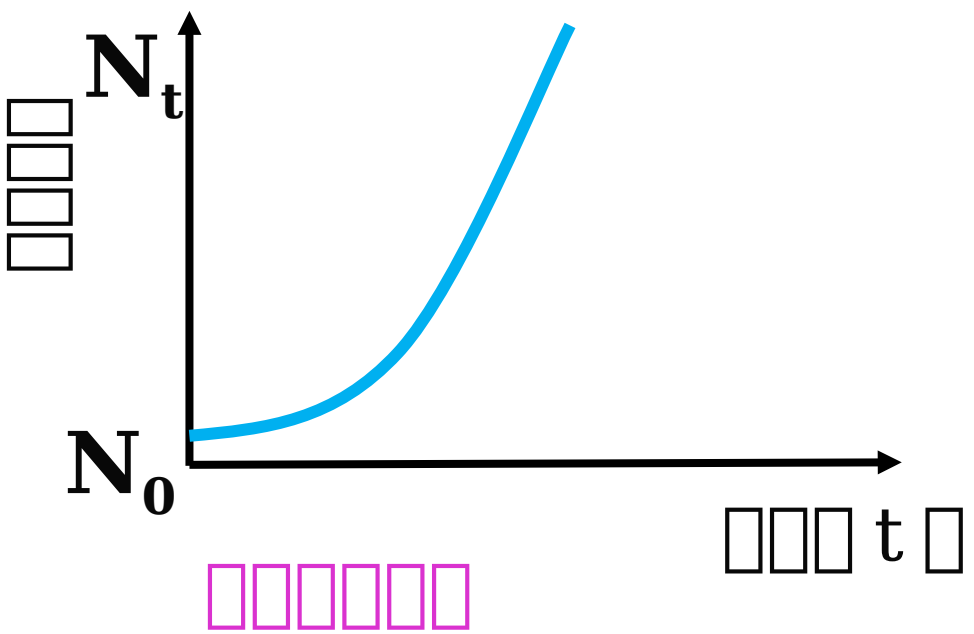


$$\frac{N_t - N_{t-1}}{N_{t-1}} \times 100 = \lambda - 1$$

5

2

= - /



“J”

= $\frac{N_t - N_{t-1}}{t}$

= $\lambda - 1$



□□□□

1. □□□□□□□□□□□□□□

1-4 □□□□□□ □“J” □□□

4-5 □□□□□□ □□

5-9 □□□□□□ □□□□

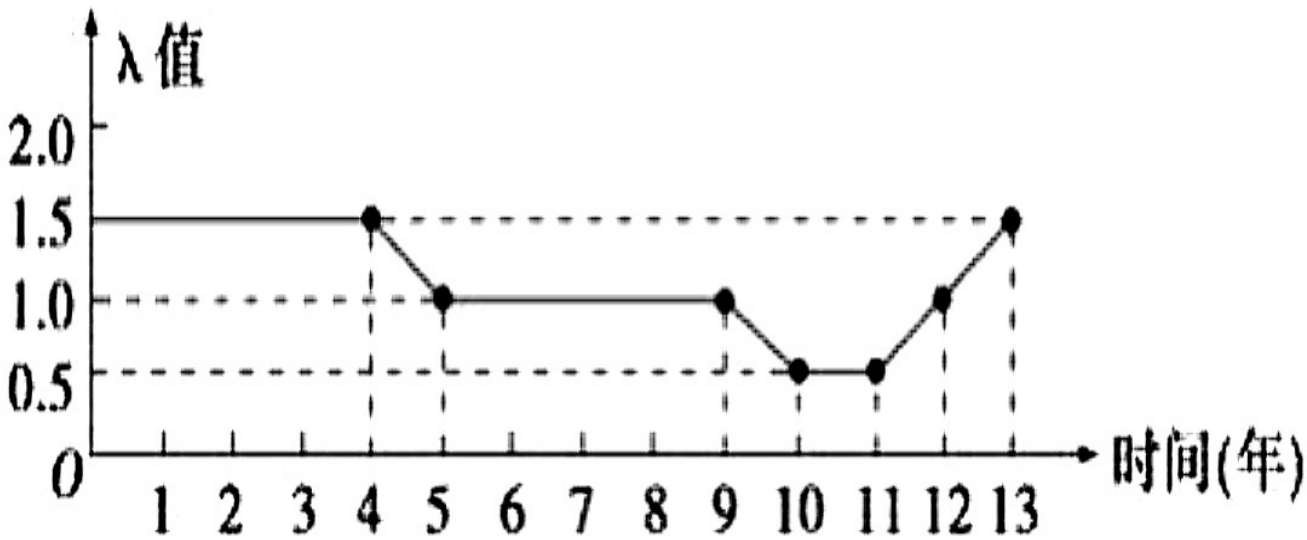
9-10 □□□□□□ □□

10-11 □□□□□□ □□

11-13 □□□□□□ **11-12** □□□□ **12-13** □□□

□ 9 □□□□□□□ □**5**□

9-13 □□□□□□□ □**12**□



□□□□□□□□“J” □□□□“S” □□□

1. □□□“J” □□□

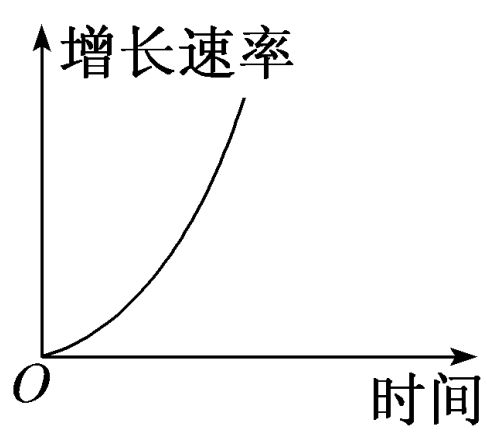
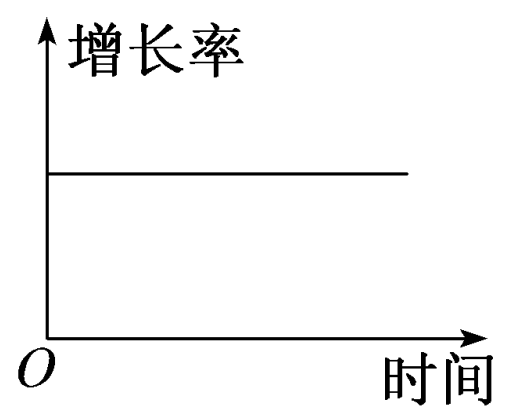
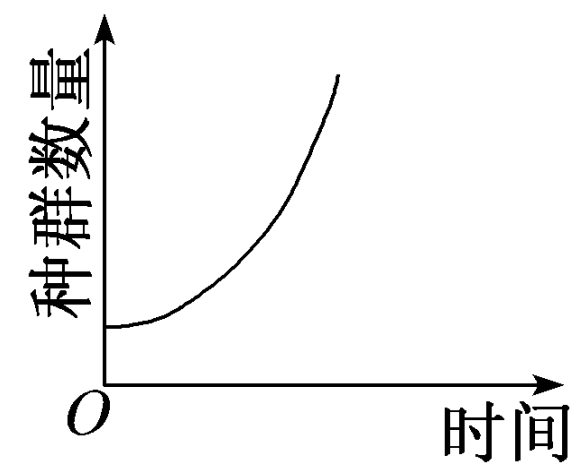
1 □□□□□□□□□□□□□□□□□□□□
□□□□□□□□□□□□□□□□□□□□

2 □□□□□□ □□□□□□□□□□□□□□□□

3 □□□“J” □□□□□□□□□□□□ $N_t = N_0 \lambda^t$

4 □□□□□□□□□□□□□□□□ □□□□□□□□
□ $\lambda - 1$ □□□□□□□□□□□□□□□□“J” □
□□□□□□□□

□□□□□□□□□□□□□□□□
□□□□□□“J” □□□□□□

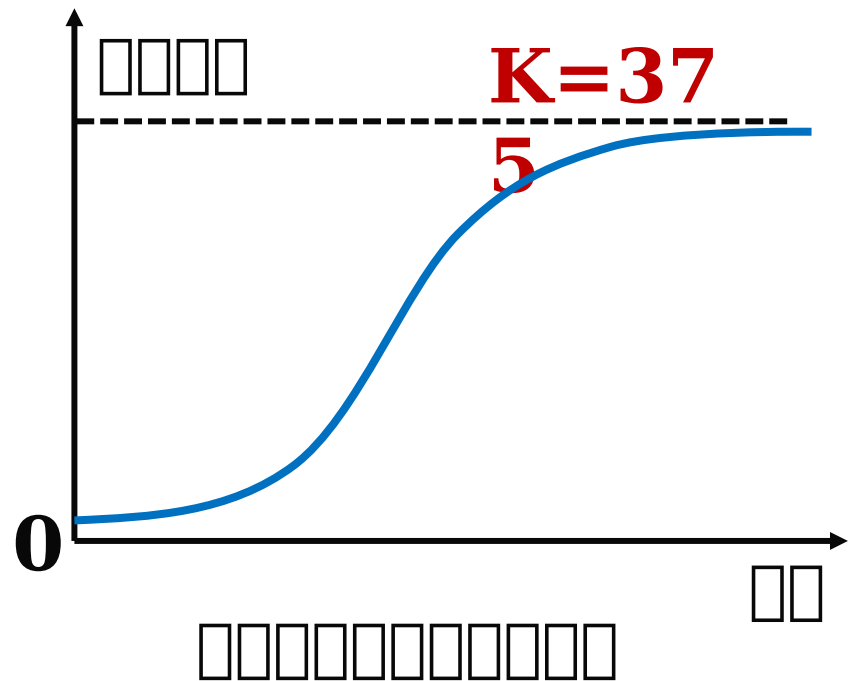




□ 5 □□□□□□□□ 0.5mL □□□□□□□□ 24 □□□□□□□□

[illegible]

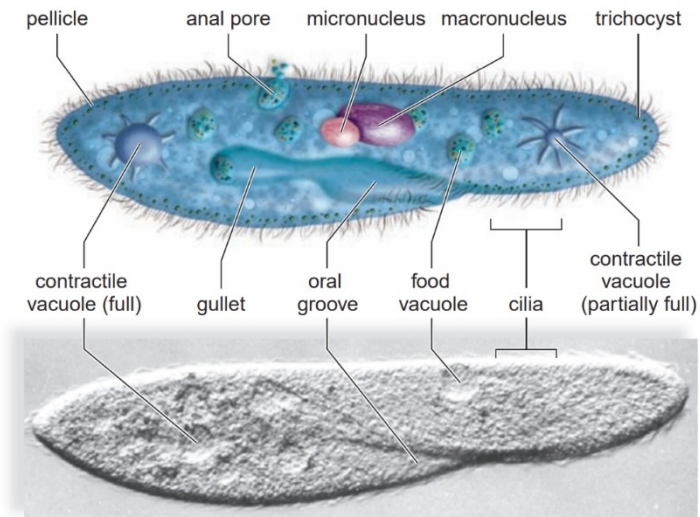
□□□□□	0	1	2	3	4	5	6
□□□□□□□	5	20	13 7	31 9	36 9	37 5	36 5



1. 0000000000000000 “J” 0000

2. □□□□□□□□□□□□□□□□

“S” 模型



The graph illustrates the logistic growth model. The vertical axis represents the population quantity (种群数量), and the horizontal axis represents time (时间). The blue curve shows the population starting at zero and growing until it reaches a stable state at the carrying capacity K , indicated by the horizontal dashed line.

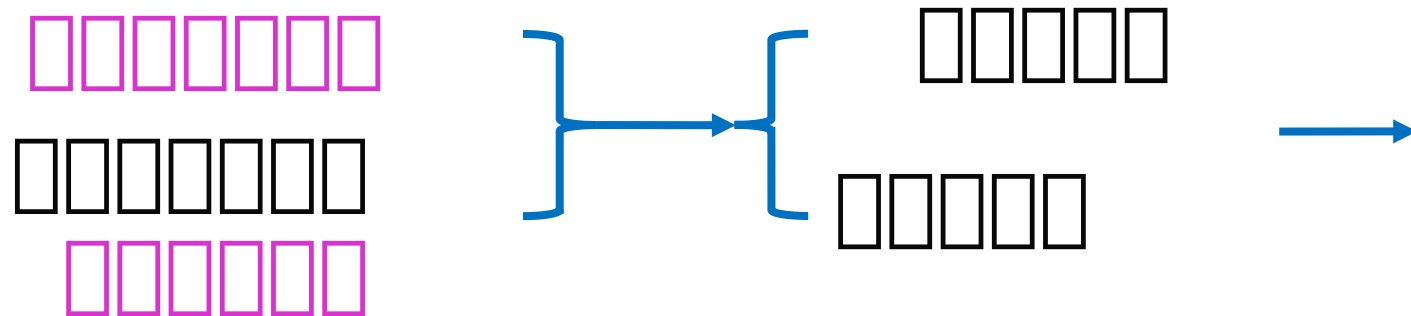
大草履虫种群的增长曲线

2. 如何“S” 如何

[illegible]

□ “ ” □ □

1



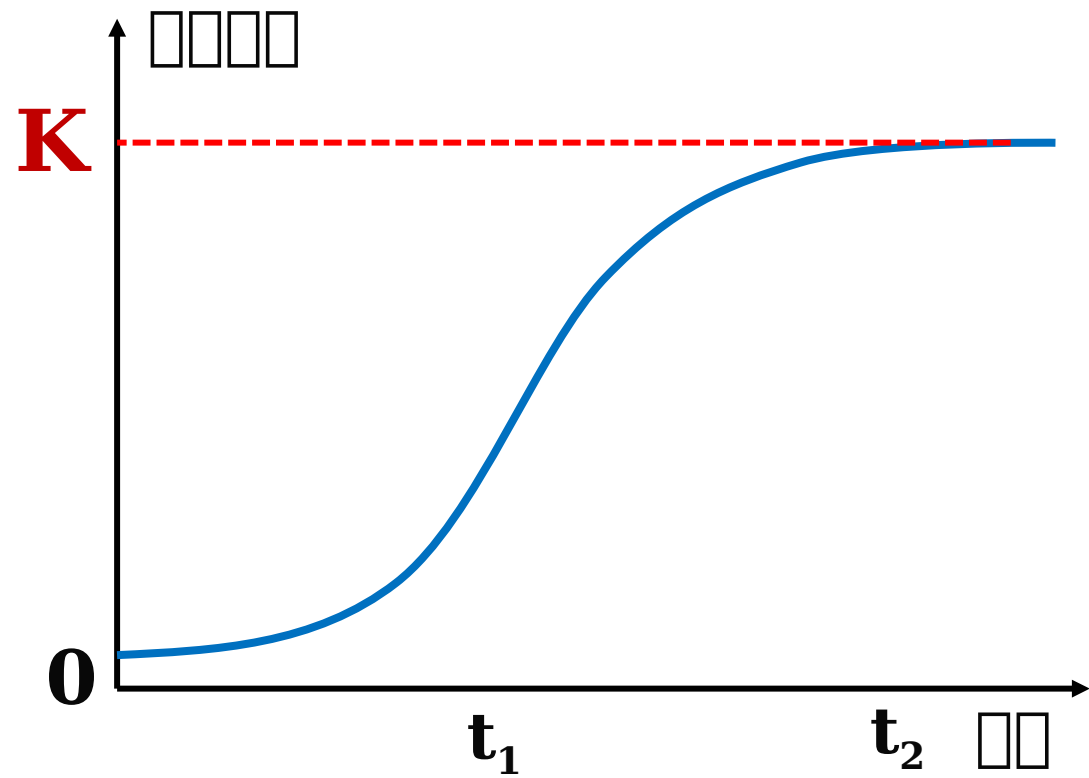
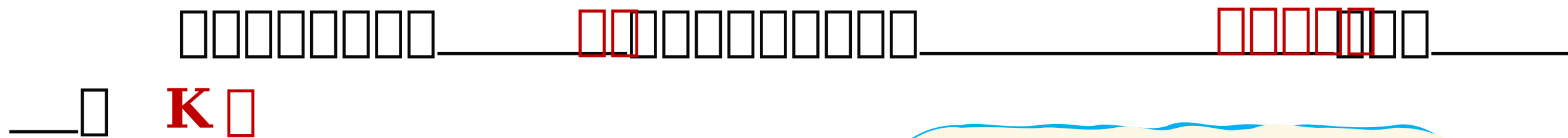
2. 問題の整理

3



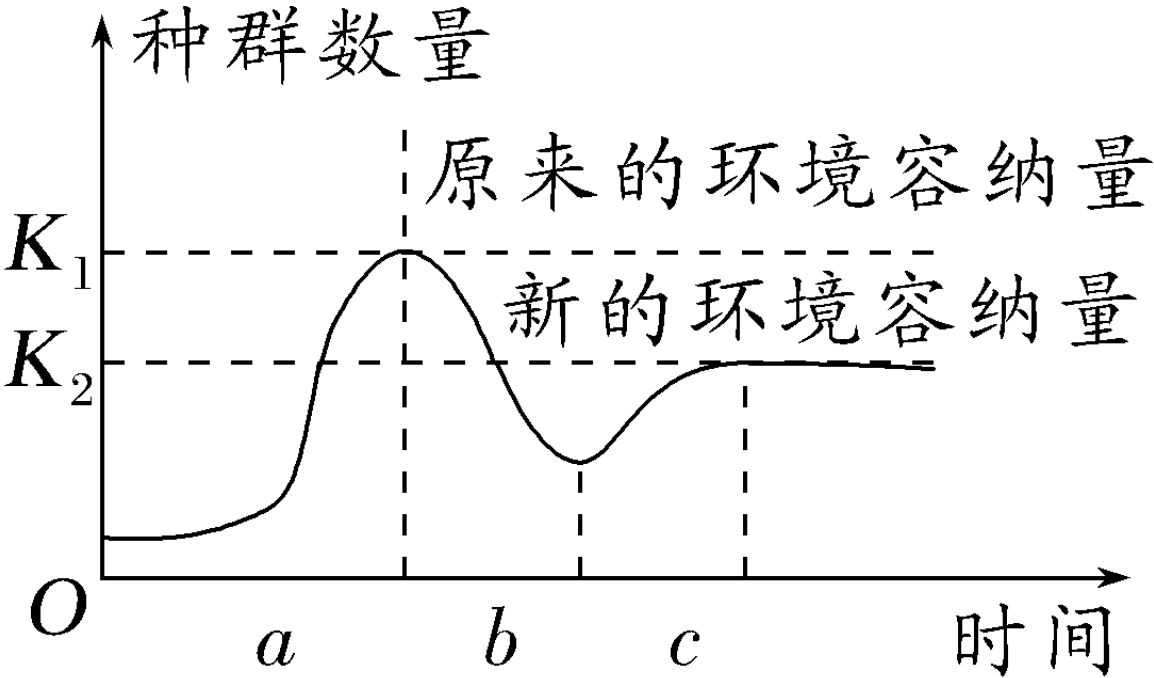
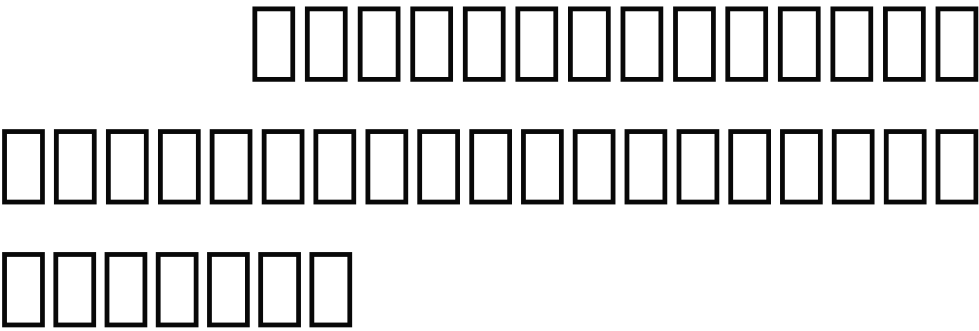
2. “S” 型

4



K

① K



② K

2. “S” 曲线

5 阶段

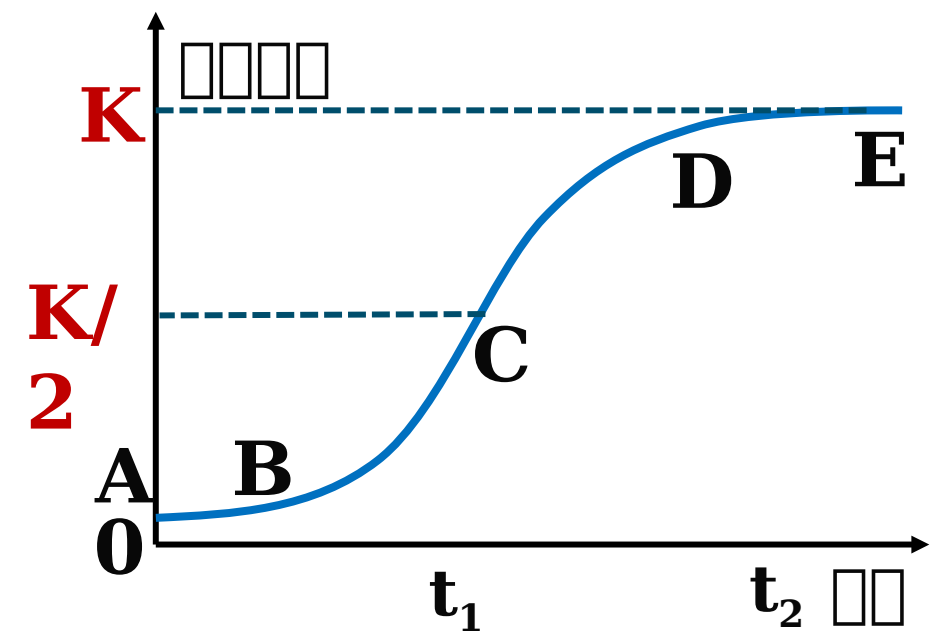
AB 阶段 初期投入，缓慢增长

BC 阶段 投入增加，增长速度加快

C 阶段 投入达到 $K/2$ ，增长速度达到最大

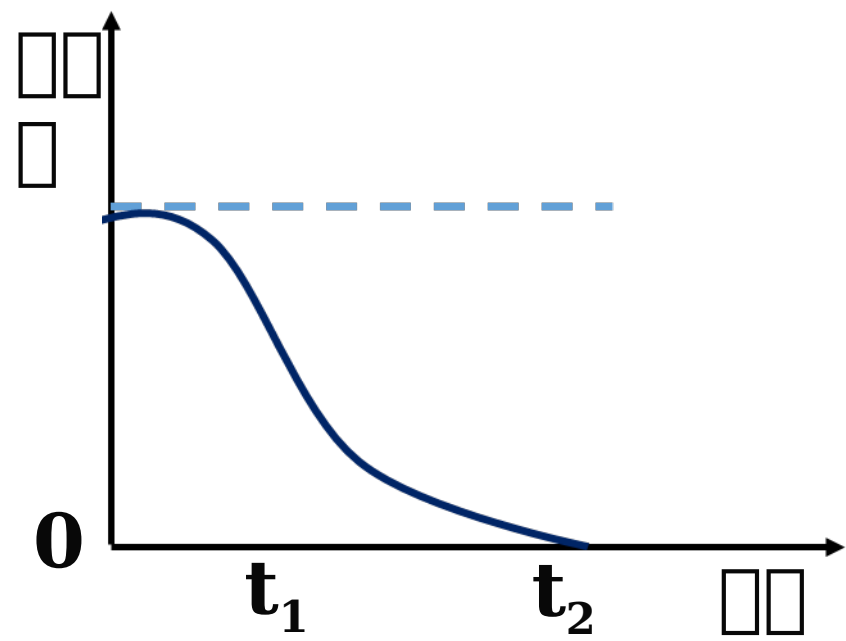
CD 阶段 投入继续增加，增长速度开始减慢

DE 阶段 投入接近饱和，增长速度趋近于 0

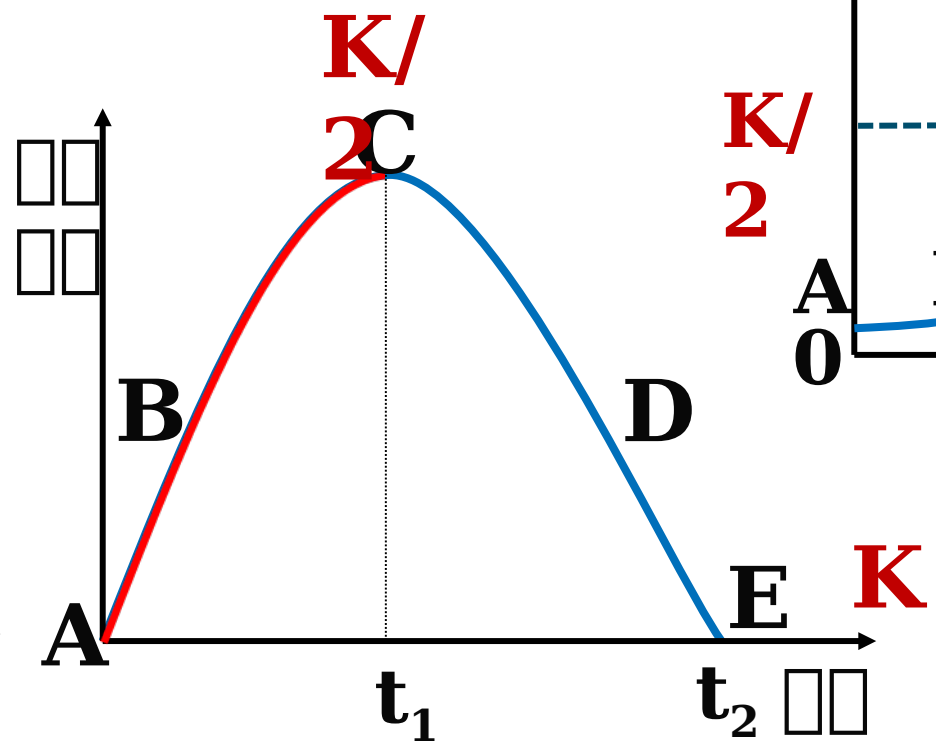


2. “S” 曲线

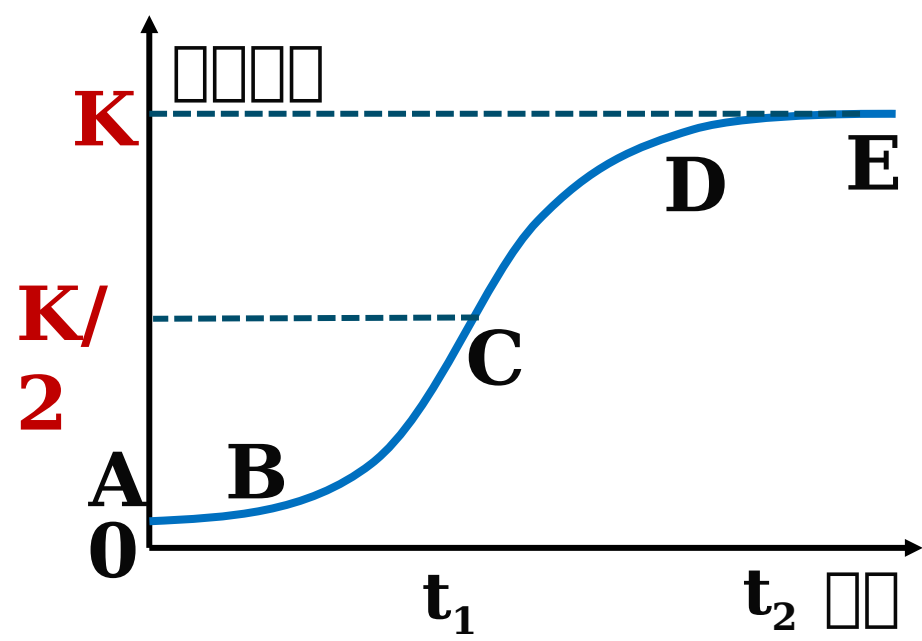
6 曲线



S 曲线



S 曲线

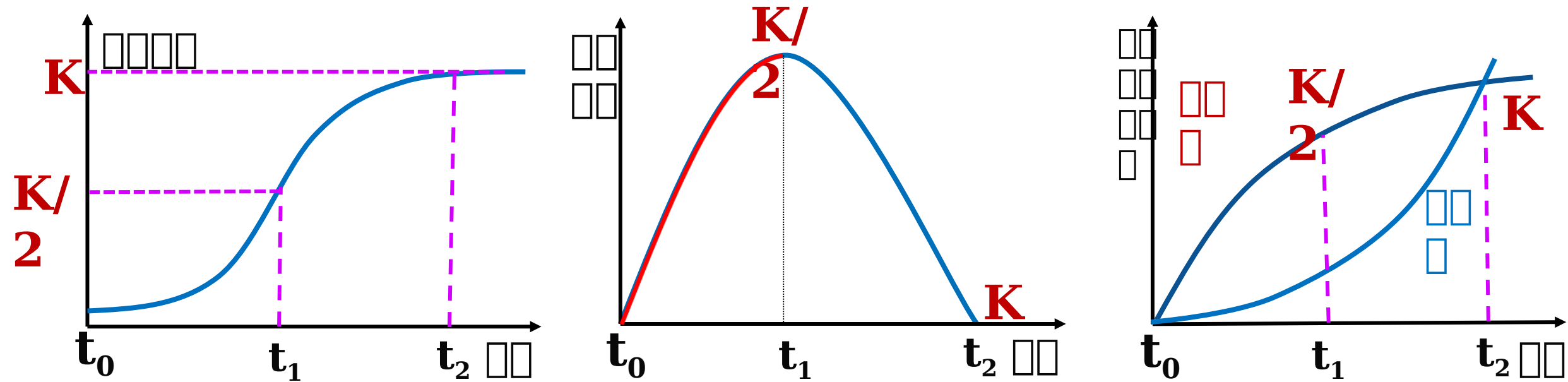


① E 曲线从 0 开始，趋向于 K

② C 曲线在 $K/2$ 处达到最大值



“S” 模型

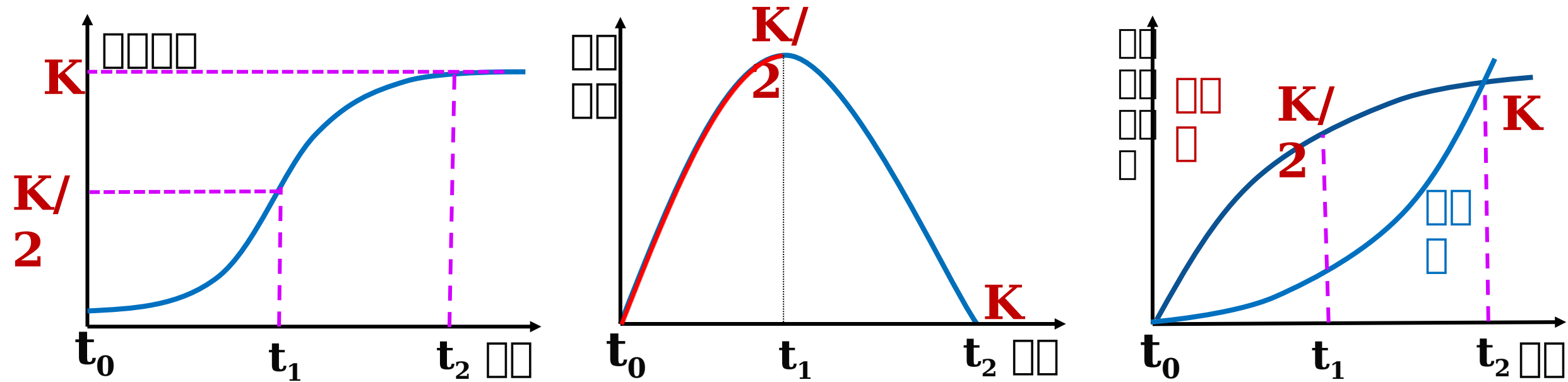


① t_0 时刻种群数量 N_0 远小于 K

② t_1 时刻种群数量达到 $K/2$ 时，种群增长速率最大



“S”

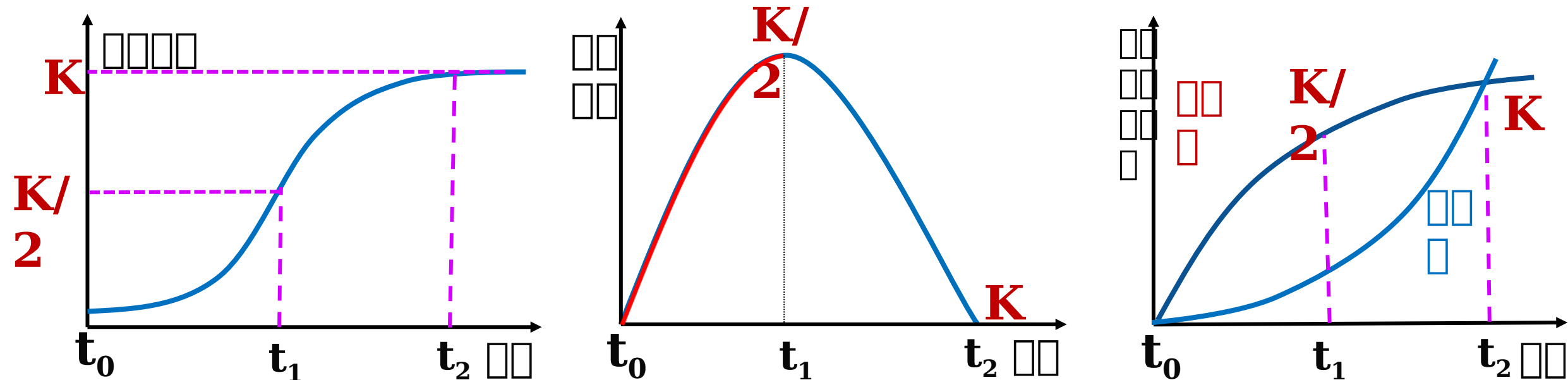


③ $K/2$

④ t_1 t_2



“S”

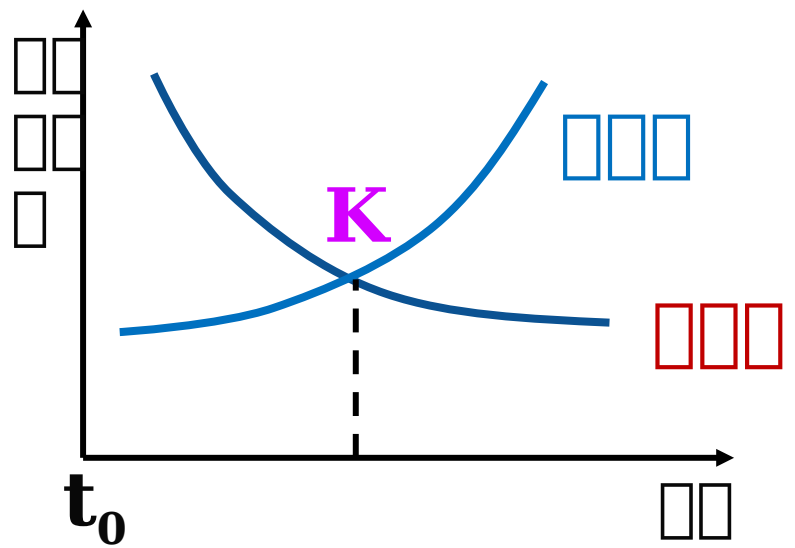
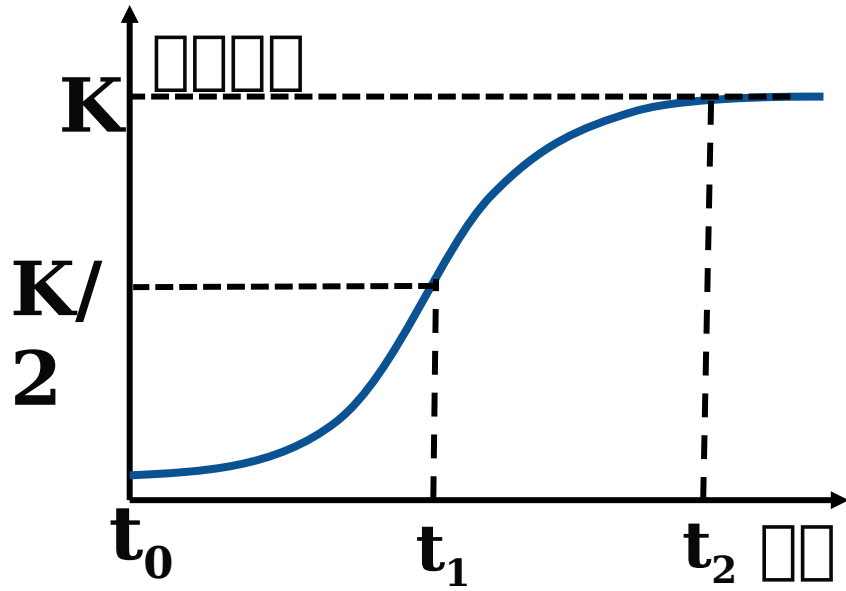
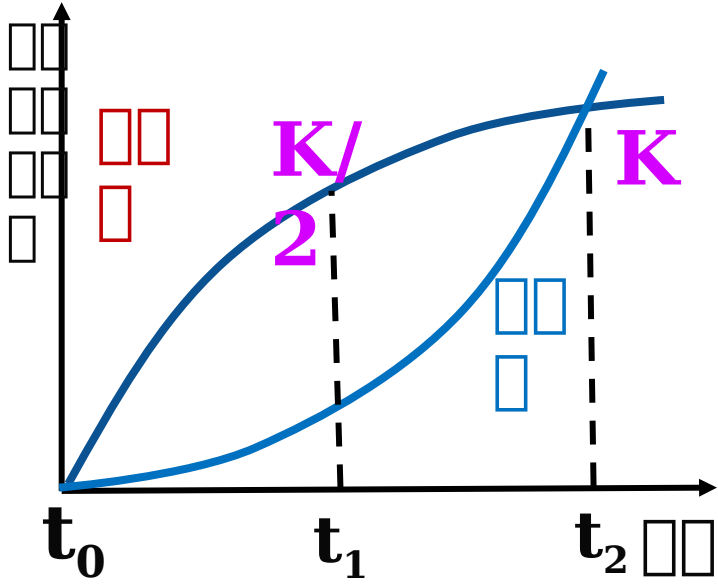
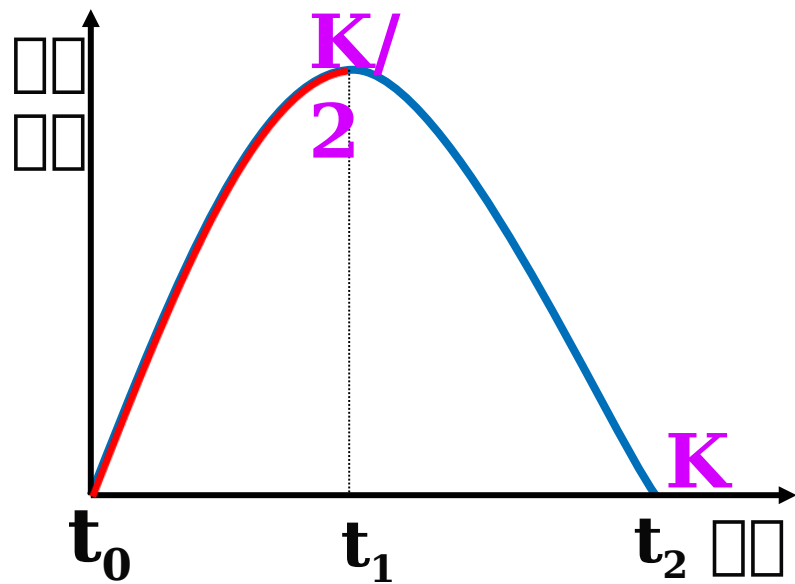


⑤ t_2 K

0



K □□□□□□ K □□□□



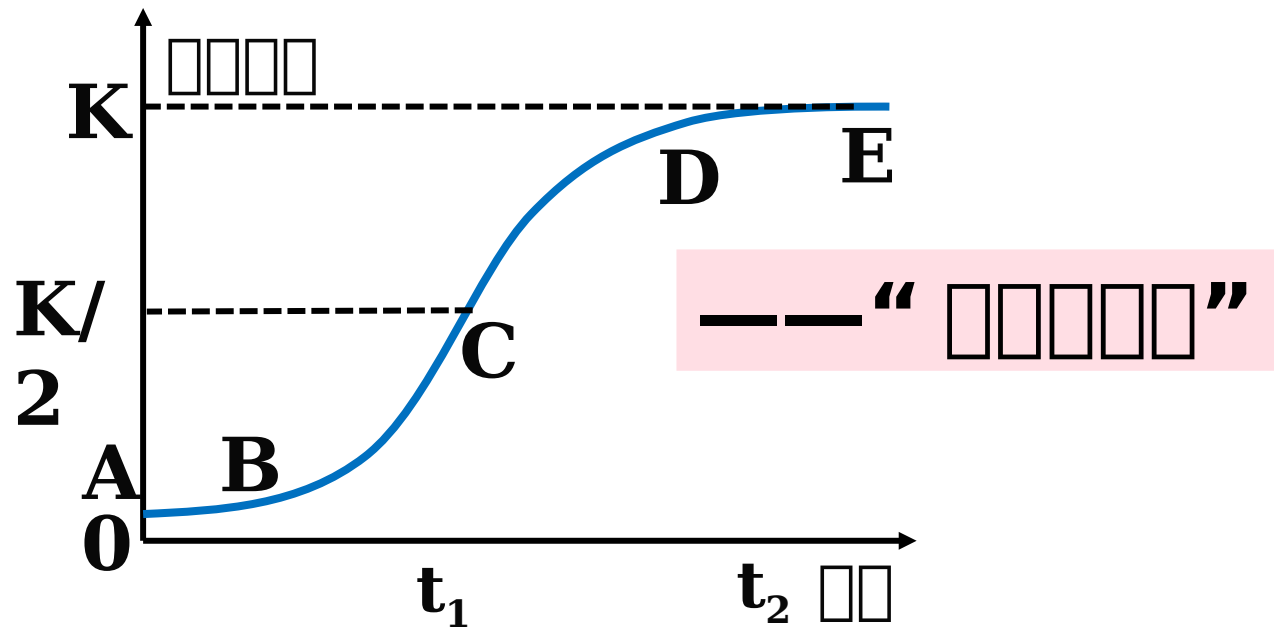
□□□□□□ K □□□
□□——□□□□□

□□□□□ K/2 □□□
□□——□□□□□

2. “S”

7 K K/2

1



K/2

K/2

7 K K/2

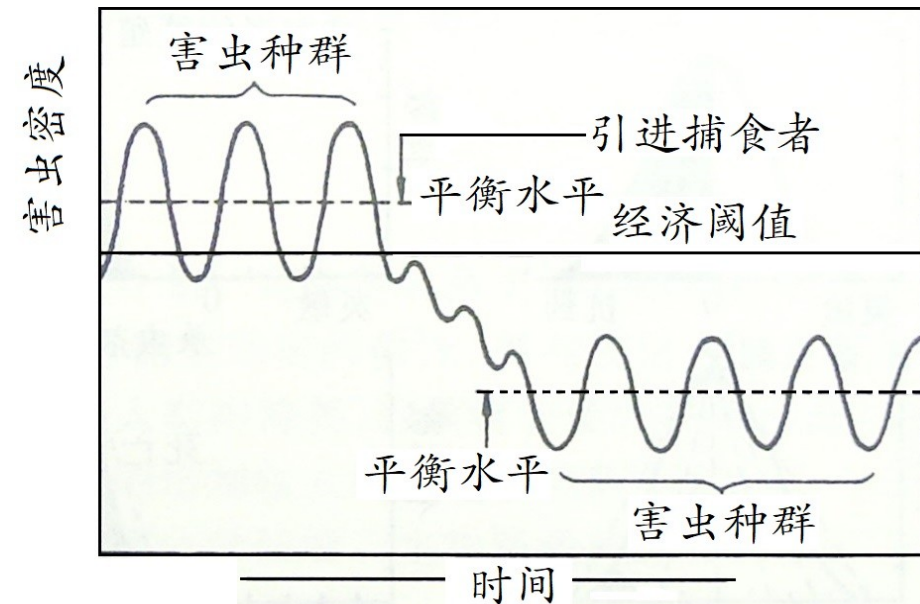
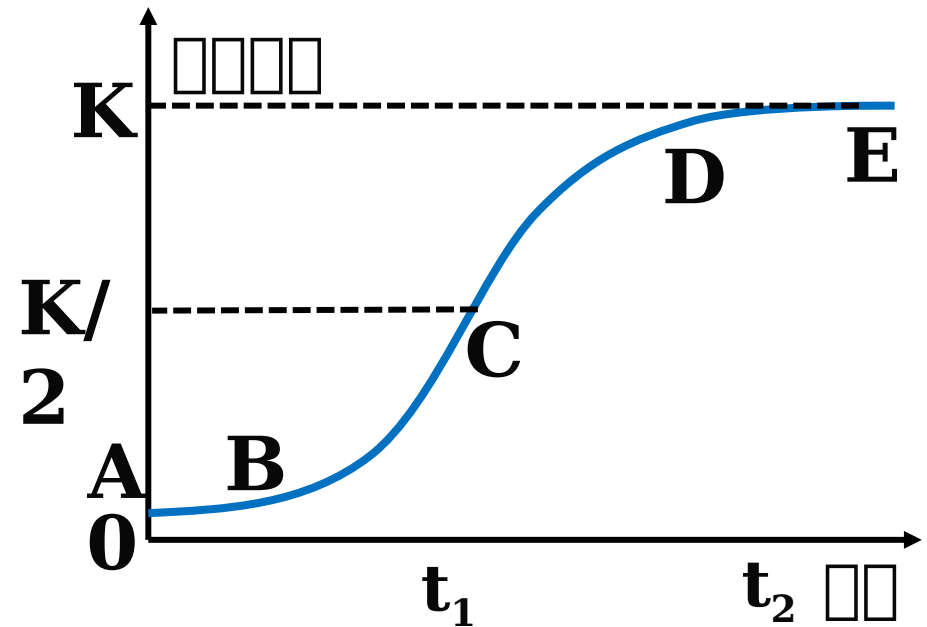
2

① ;

→ K →

② K/2

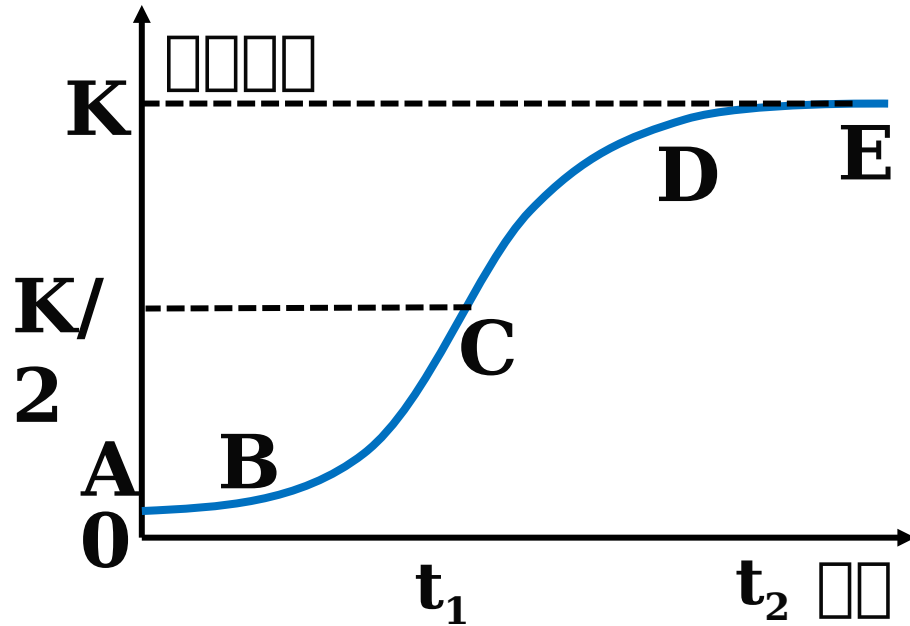
K/2



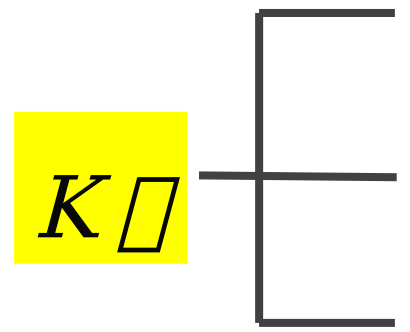
生物防治成功的典型结果
(仿Krebs, 1994)

7 K K/2

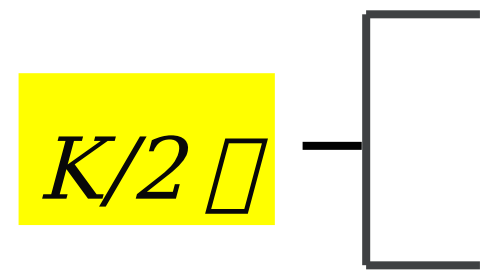
3



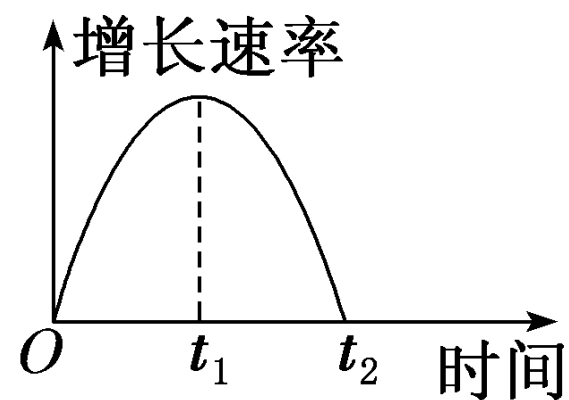
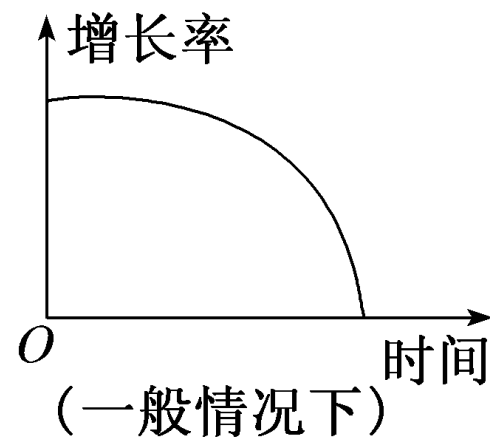
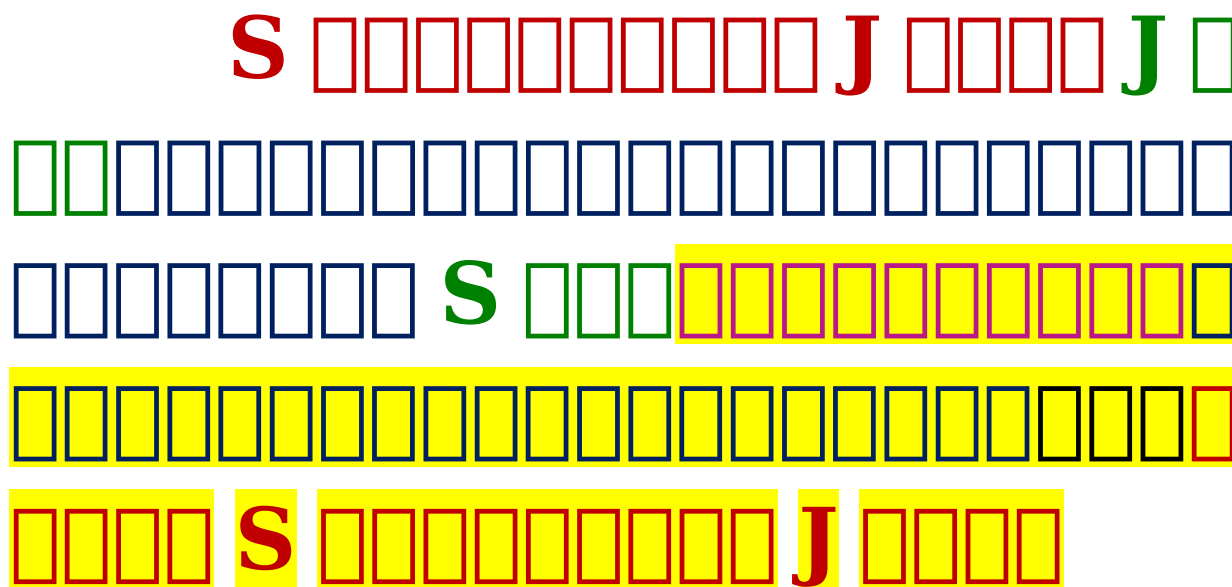
K



→ K →
→ K →
→ K →



$K/2$
 $K/2$





□□□□□□□“J” □□“S” □□□□□□□□□□□□

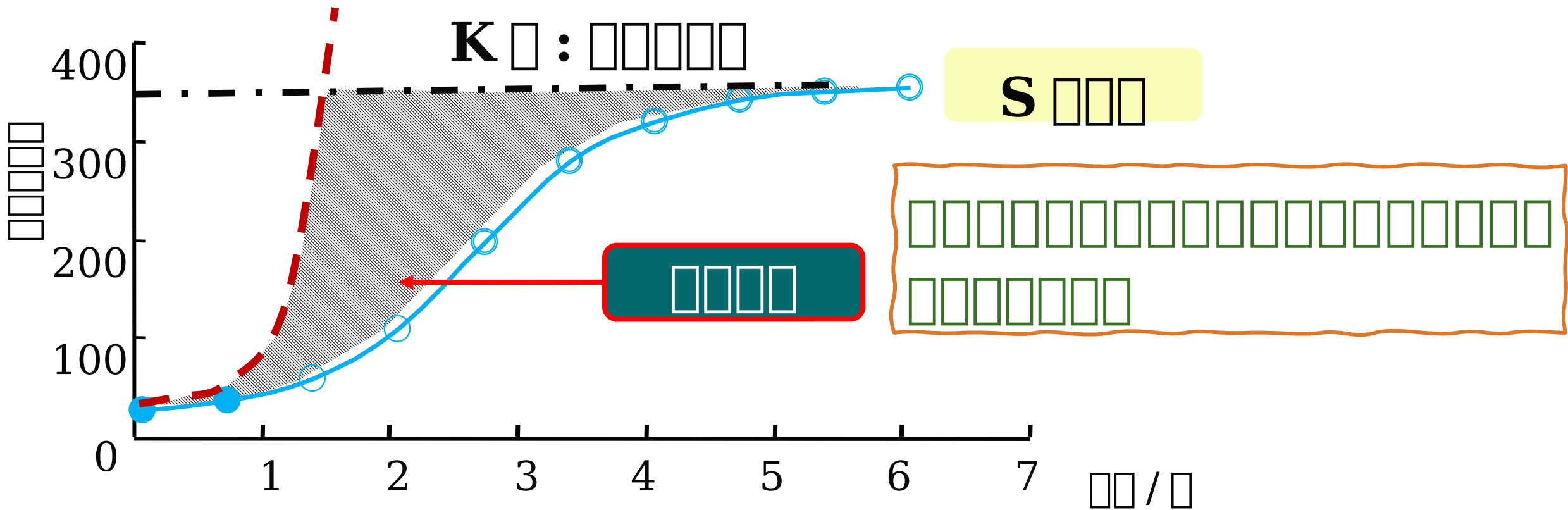
[illegible]

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J □ □ □

K □ : □ □ □ □ □

S ☐ ☐ ☐





1.(2024·) r - K -

r -

K -

N_t N_{t-1}

()

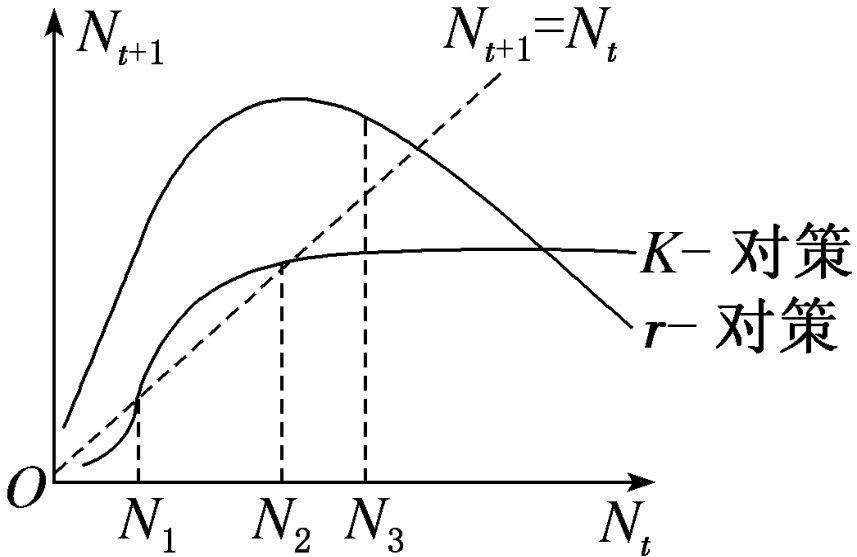
D

A. r -

B. N_1 K -

C. K - N_2

D. N_3 r -





2.() (2023·)

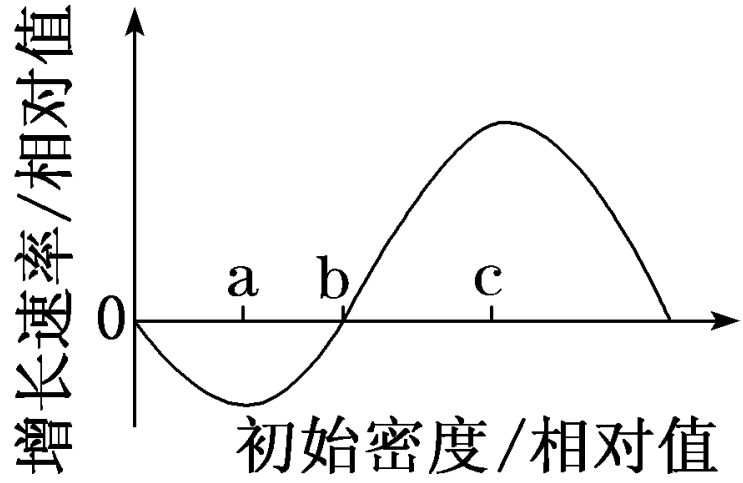
()

A. 0 a 0

B. a c

C. c

D. b



AC



3.() (2024·)

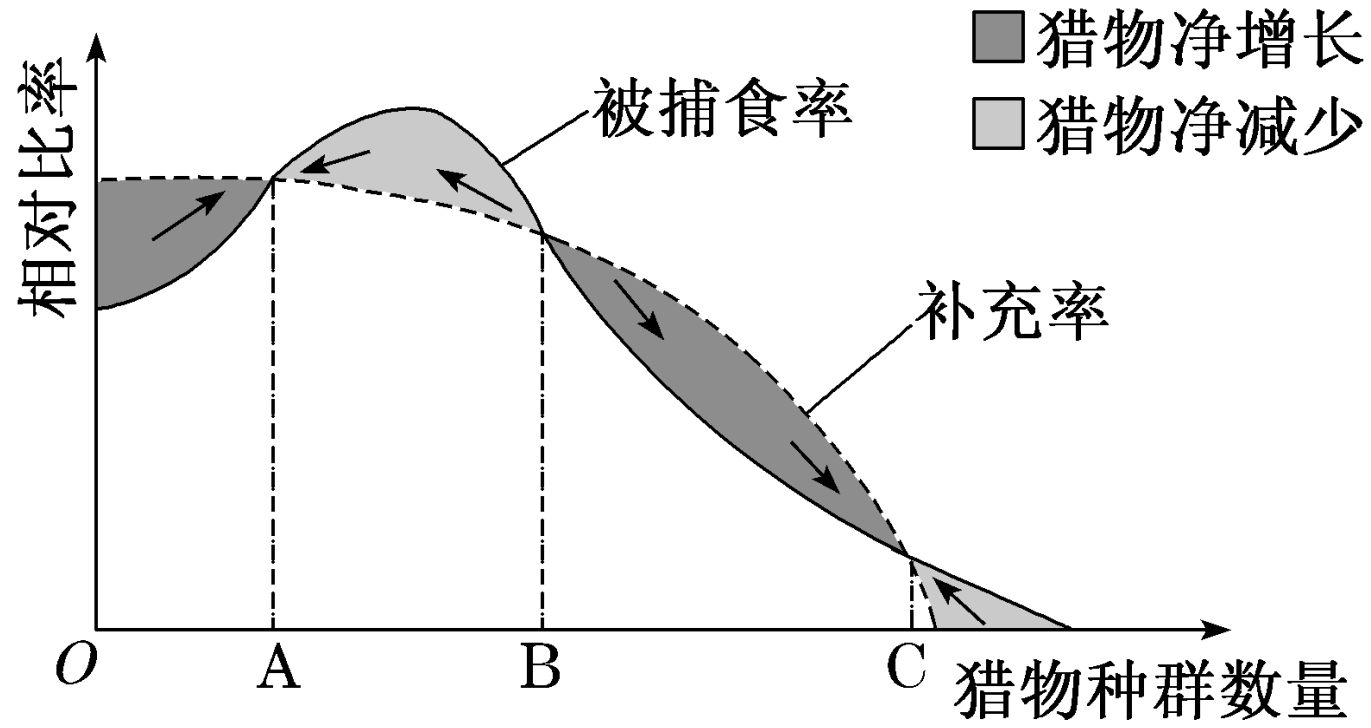
(

A.

B. B

C. A B

D. B K K C



) **BCD**

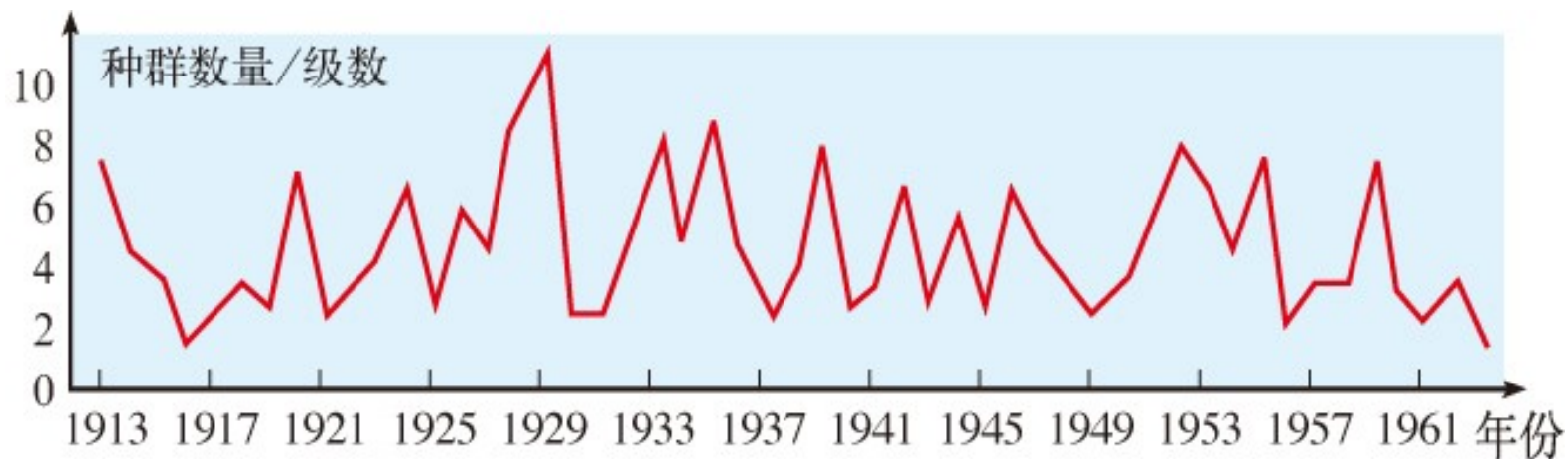


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3. □□□□□□

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② 



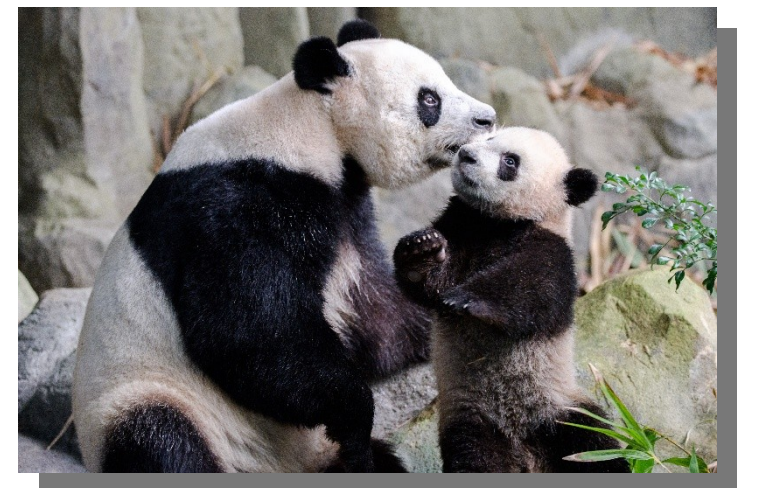
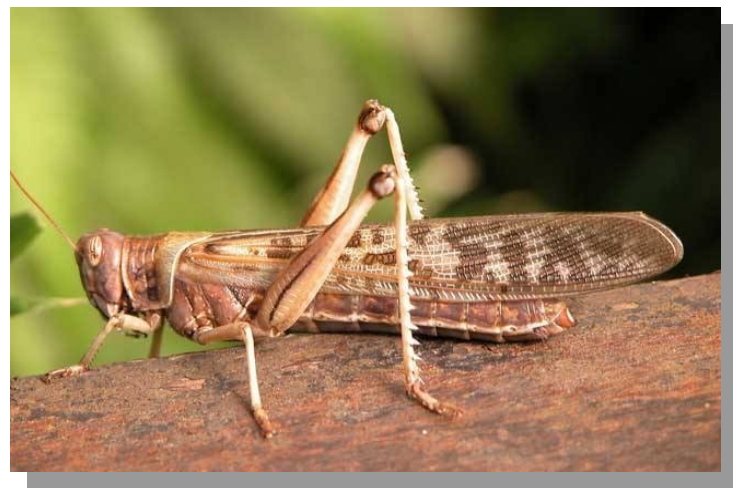


4. □□□□

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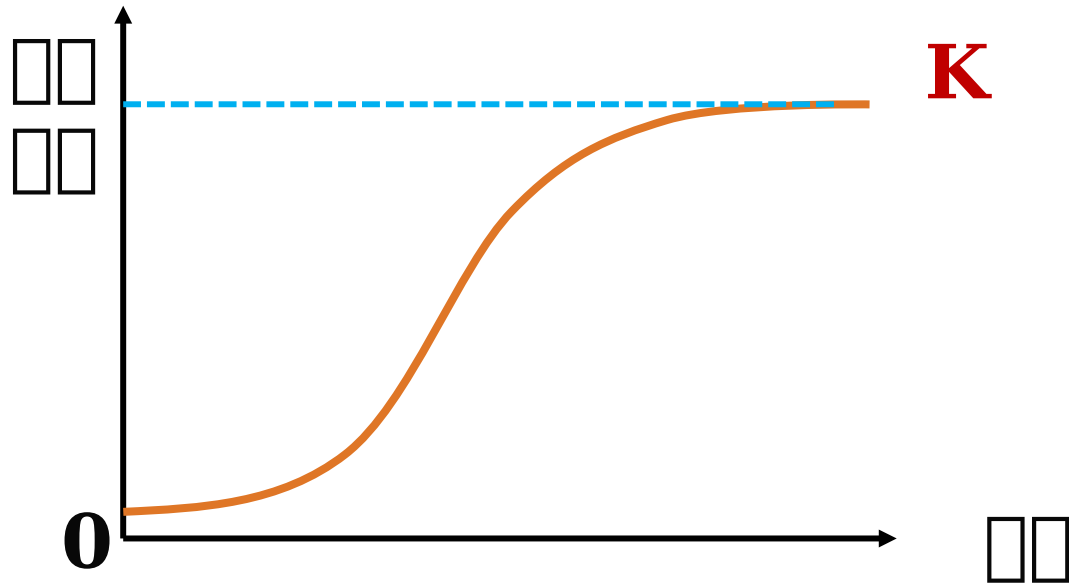
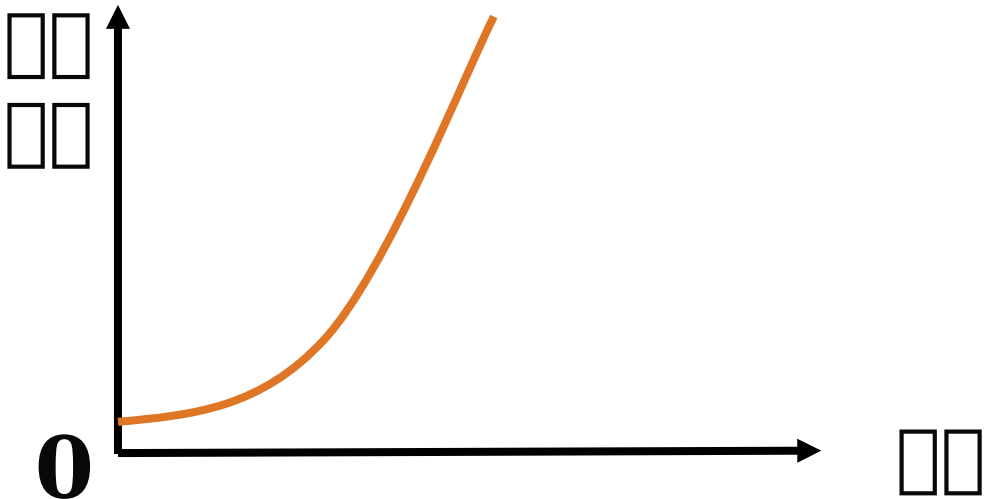
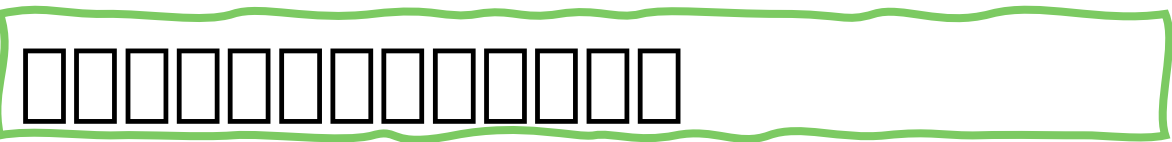
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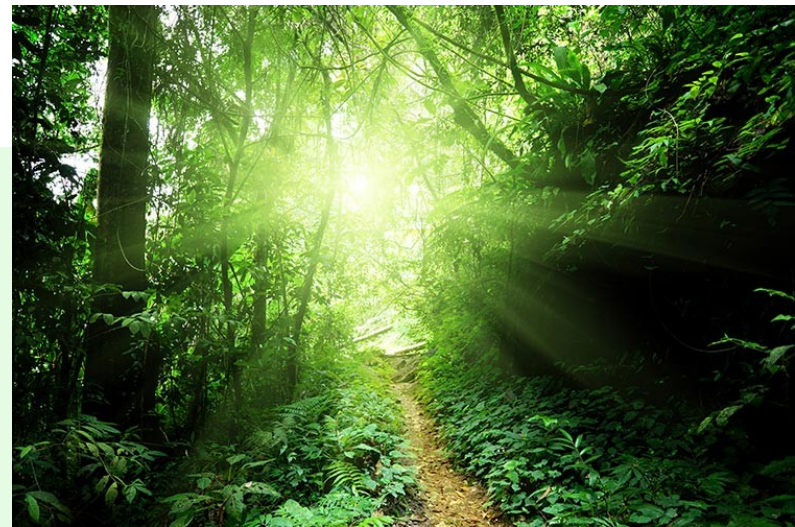


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1. □□□□□

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1. 臺灣水資源

3 項

臺灣水資源短缺原因



臺灣水資源短缺原因

自然因素

臺灣水資源短缺原因 10% 20% 人為因素

自然因素

1. □□□□□

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An aerial photograph of a lush, green tropical rainforest. A dark, winding river flows through the dense canopy, forming a large loop that encircles a prominent, isolated island in the center. The forest is composed of various shades of green, indicating different types of trees and vegetation. The river's path is irregular, with several smaller branches and pools visible. The overall scene depicts a pristine, undisturbed natural environment.

2. □□□□

1

A diagram of a 1D lattice consisting of 32 sites. The sites are represented by vertical rectangles. The lattice is divided into three segments by two horizontal lines. The first segment contains 8 sites, the second contains 12 sites, and the third contains 12 sites. In the first segment, the 4th, 5th, 6th, and 7th sites are highlighted with red boxes. In the third segment, the 28th, 29th, 30th, and 31st sites are highlighted with red boxes.

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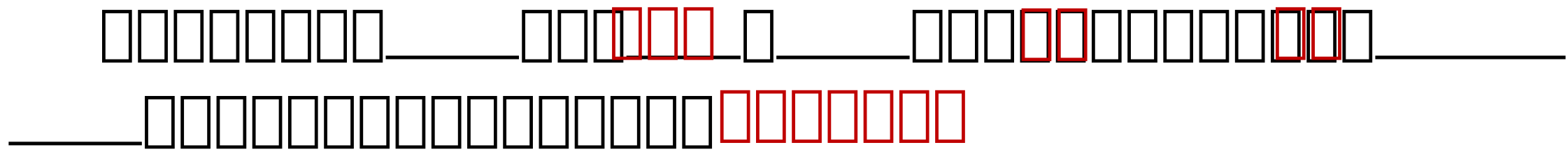


11

1

A lioness is running across a green field, carrying her cub in her mouth. A cheetah is chasing them from behind, baring its teeth. The background shows a blue sky and distant hills.

2



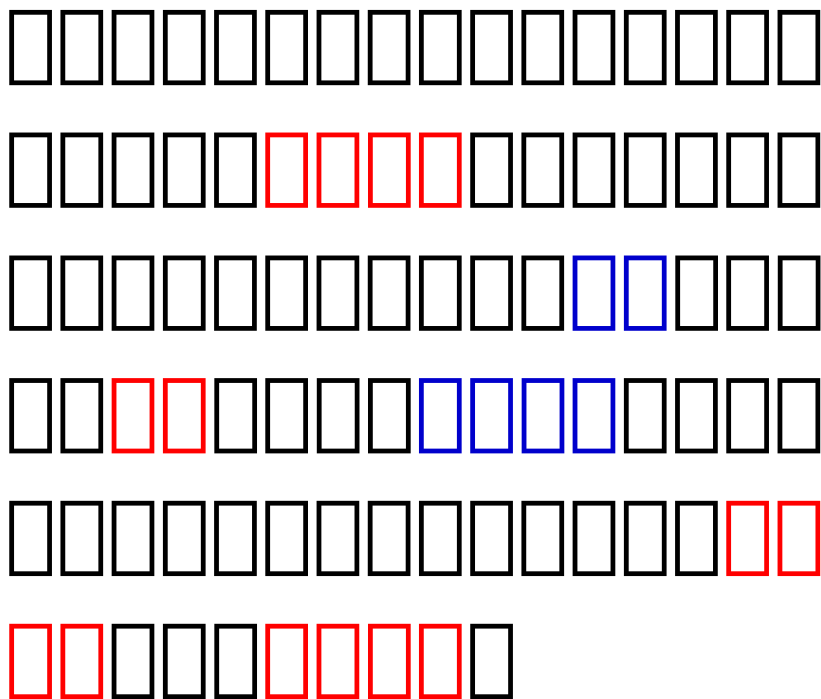
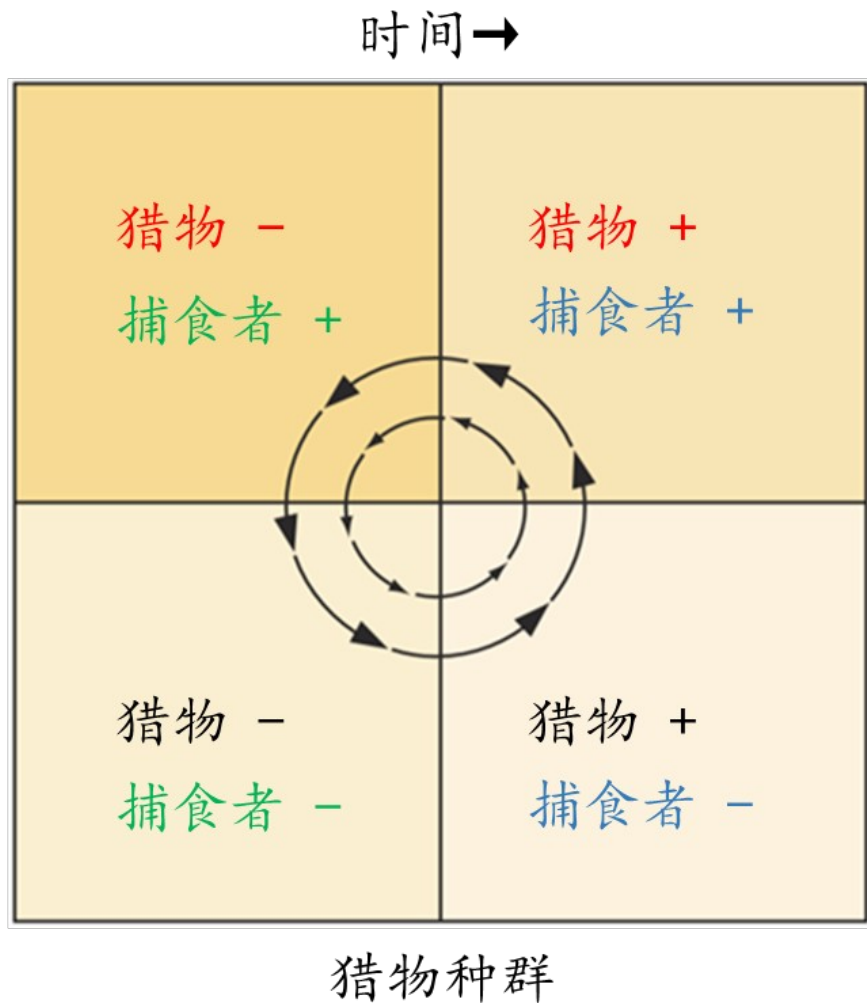
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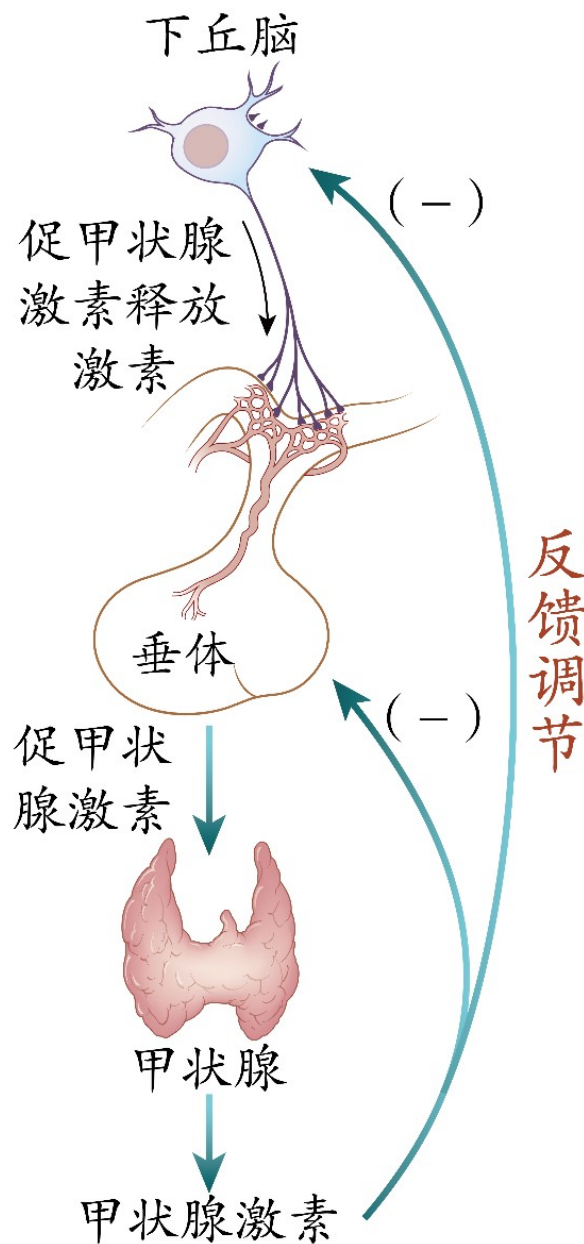


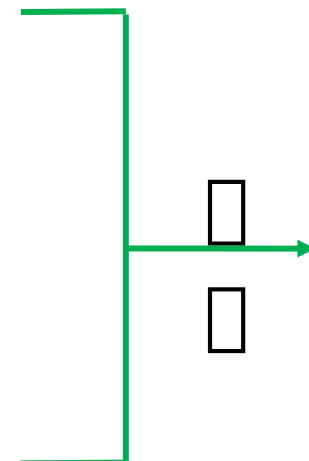
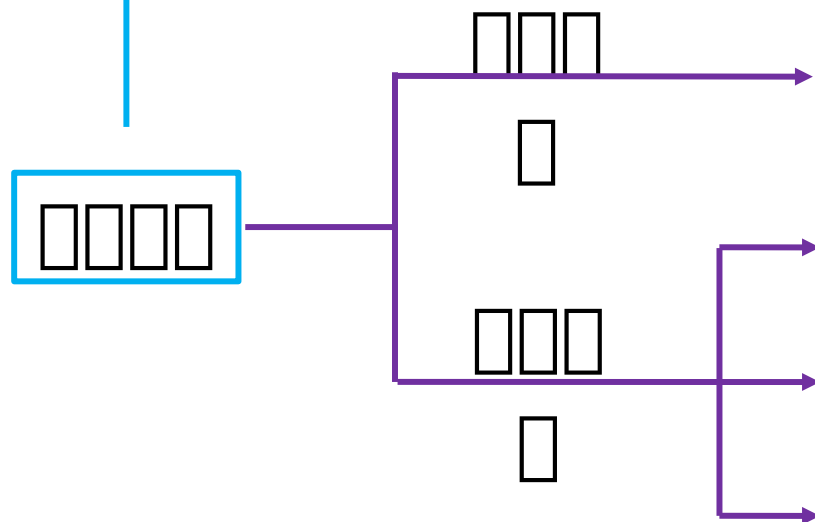
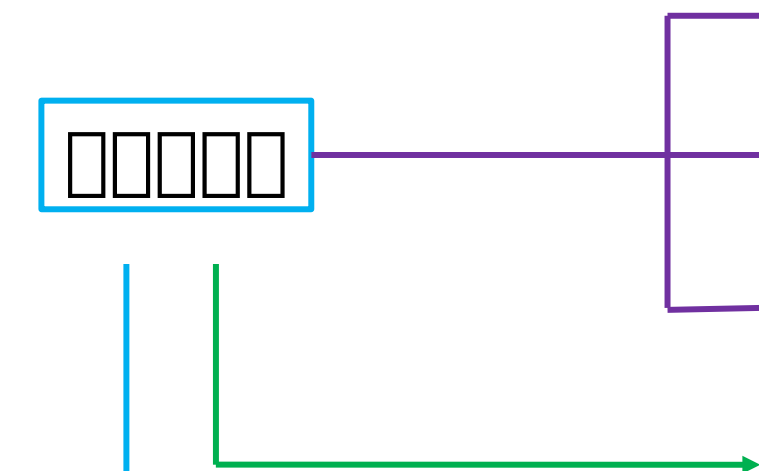
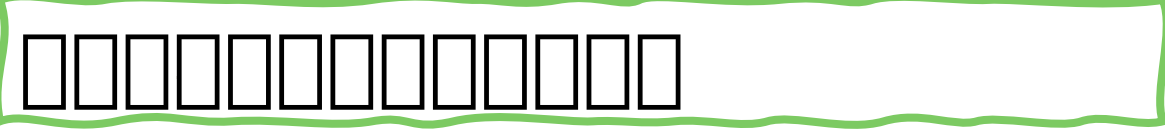


捕食者种群



分级调节







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□ 2 □□□ : □□□□□□□□□□□□□□ □□□□□□□□□□
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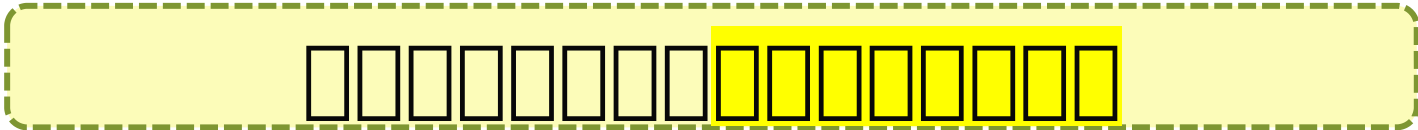
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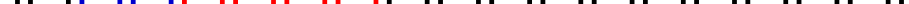
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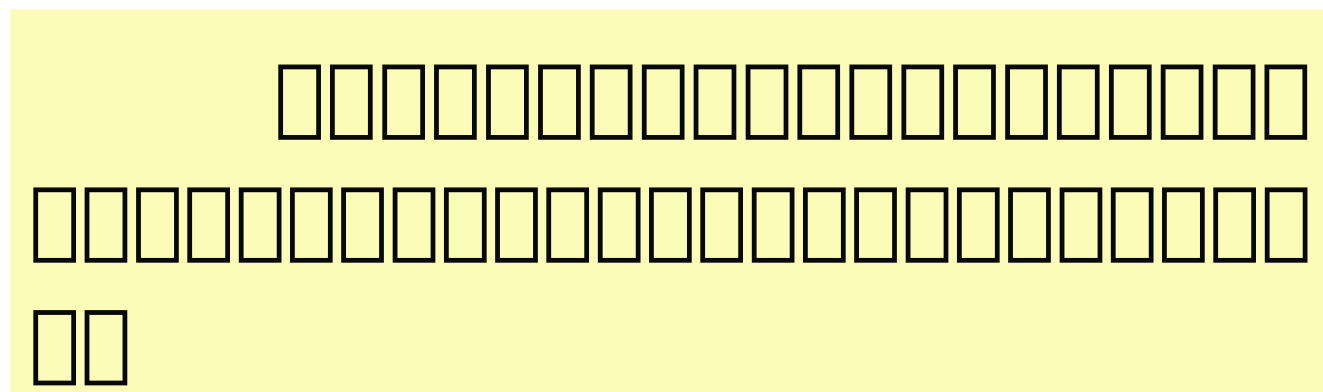


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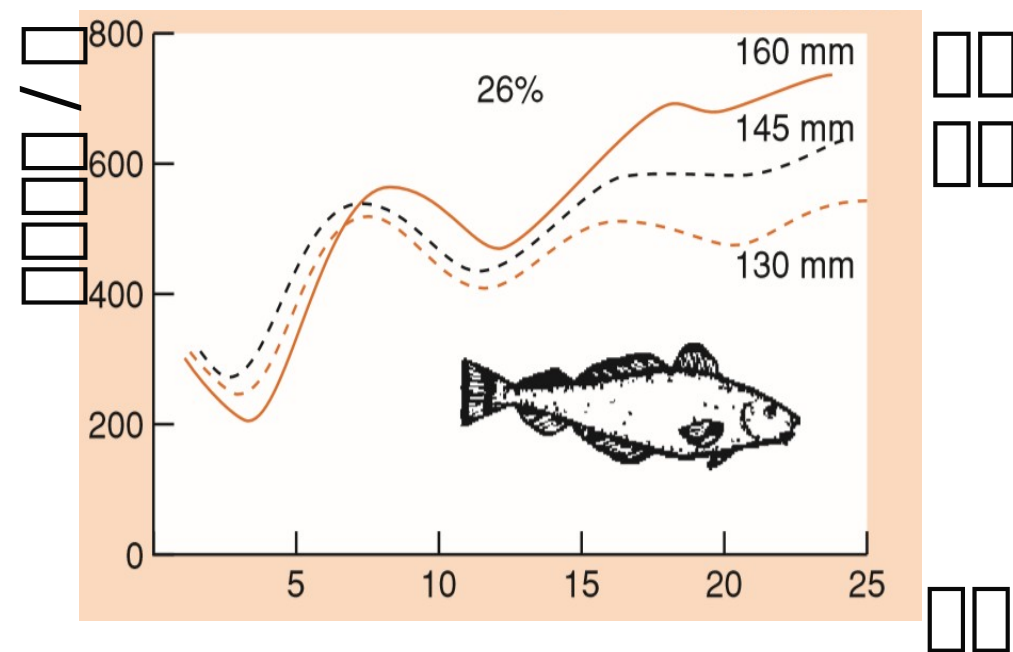
①

A diagram of a 1D lattice with K sites. The lattice is represented by a horizontal row of squares. The first 12 squares are black, followed by a gap, then 12 more squares. The 13th square is red and labeled $K/2$.

② 



③ “ ” “ ”



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3. □□□□□□

□ 1 □□□□□

① □□ □□ □□ □□□□□□□□□□□□□□

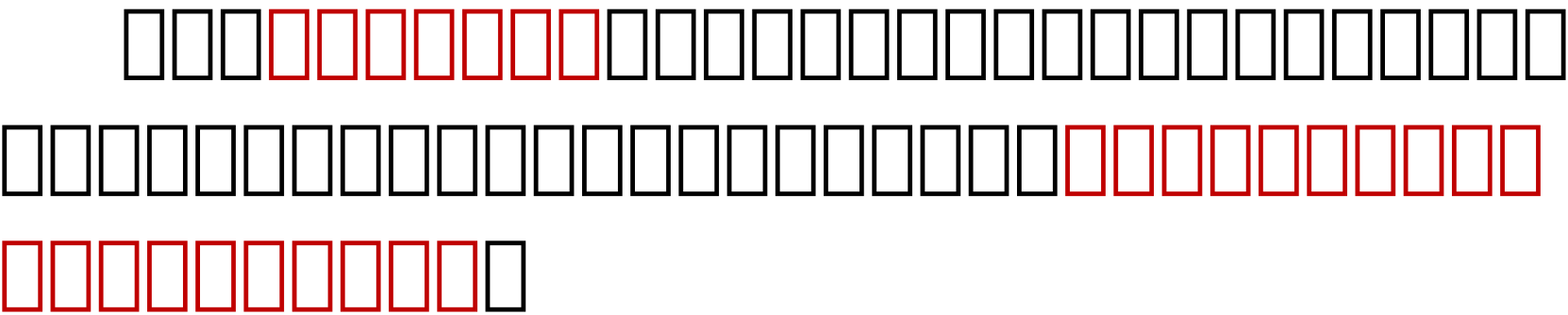
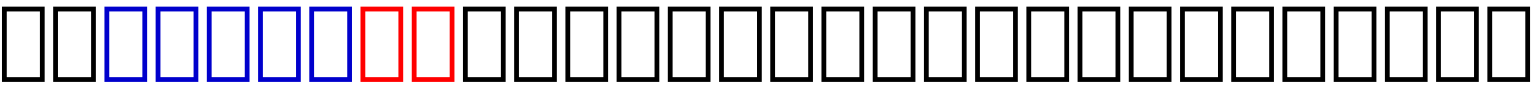
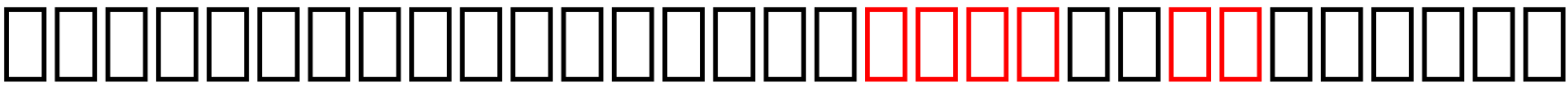
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1.(2024·)

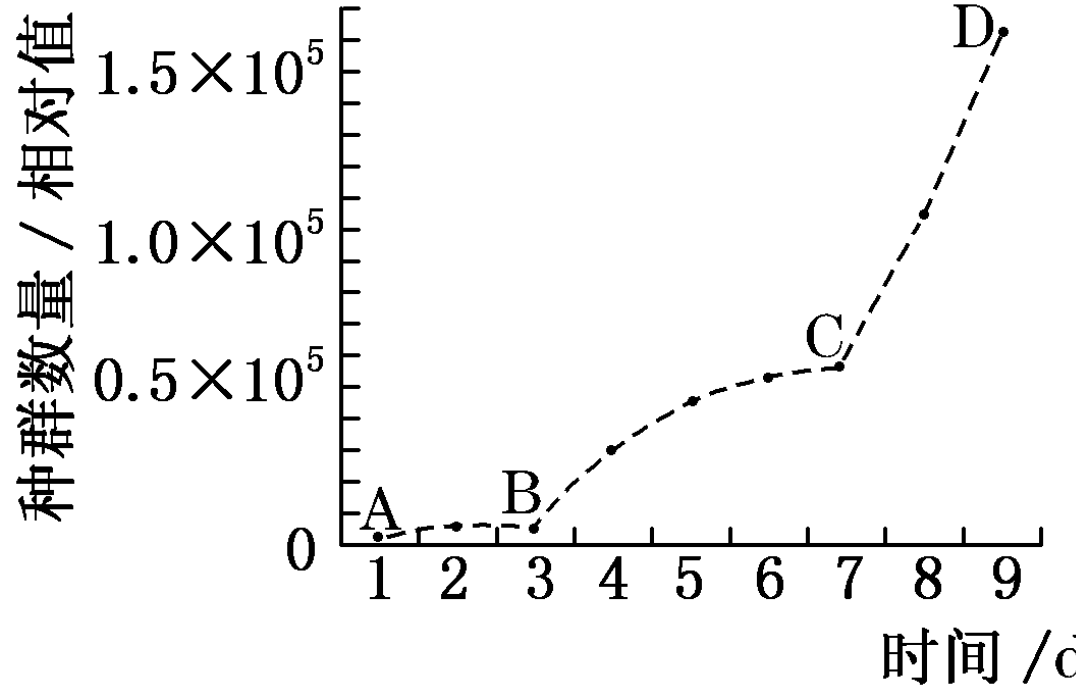
() **B**

A.AB

B.BC

C.CD “J”

D.





D. □□□□□□□□□□□□□□□□□□□□□□

A



3. □□□□□□□□□□□□□□□□□□□□

□□□□ (**C**)

A. □□□□□□□□□□□□□□□□
□□□□□□□□□□□□□□□□

B. □□□□□□□□□□□□□□□□□□□□

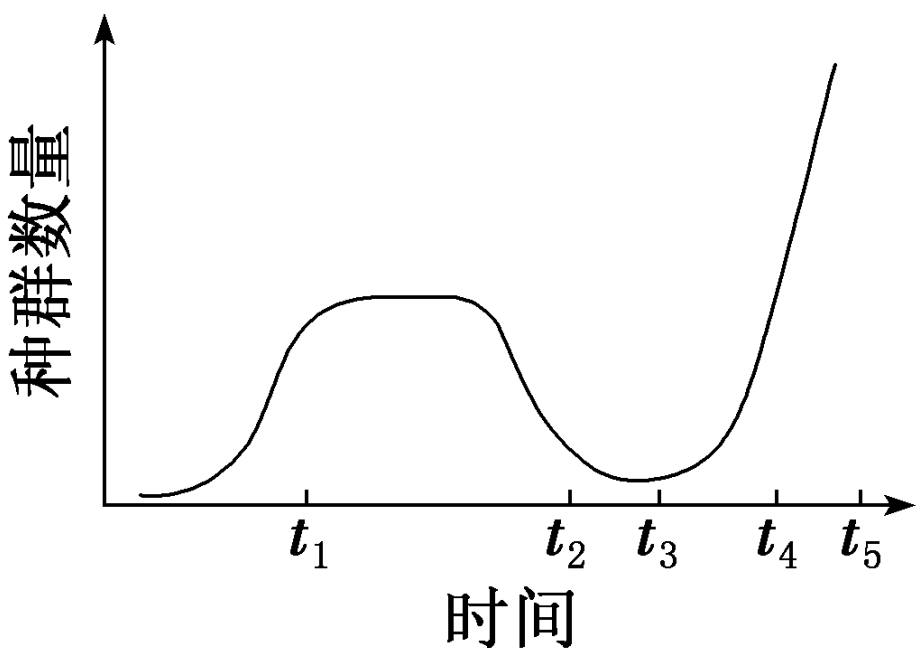
C. “S” □□□□□□□□□□□□□□□□□□□□

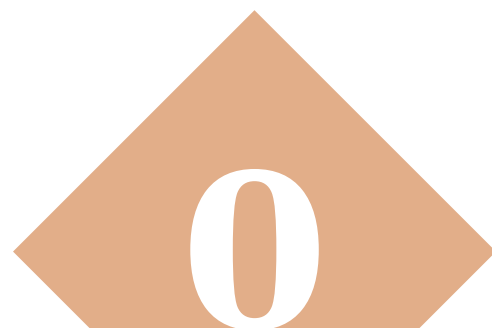
D. □□□□□□□□□□□□□□□□□□□□

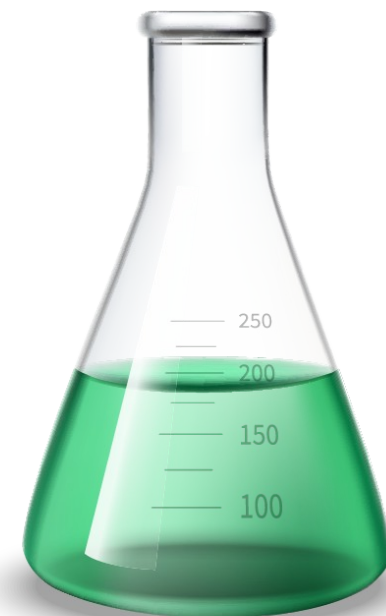
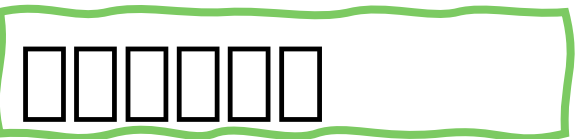
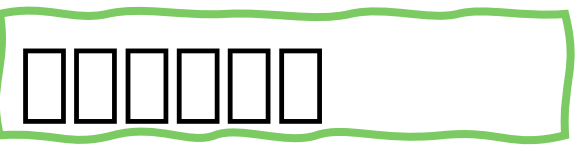


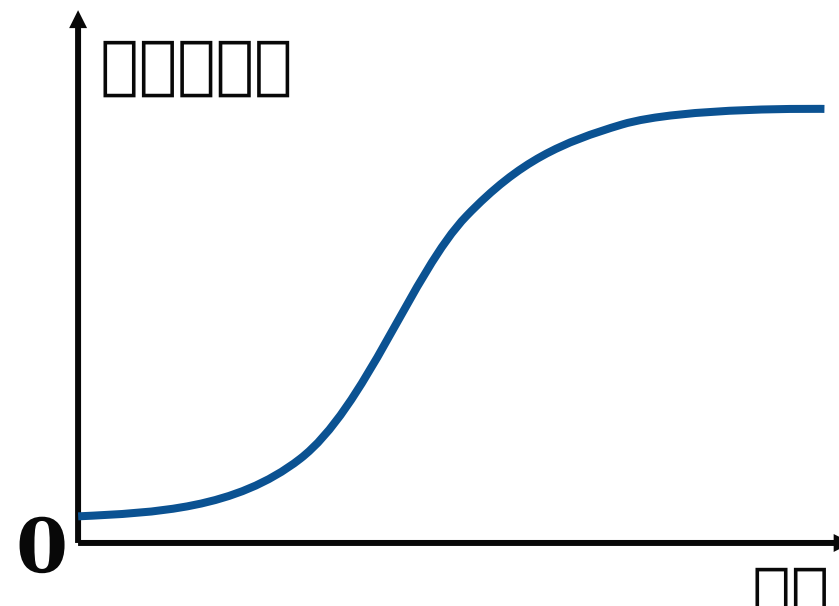
4.(2024 年 1 月 · 普通高等学校招生全国统一考试) 某物种迁入新环境后, 按图所示曲线增长。该物种在 t_1 时, 种群数量达到环境容纳量的一半, 此时种群增长速率最大。在 t_2 时, 种群数量达到环境容纳量 K , 此时种群增长速率为零。在 t_3 时, 种群数量开始下降, 此时种群增长速率为负值。在 t_4 时, 种群数量达到最低点, 此时种群增长速率为零。在 t_5 时, 种群数量开始回升, 此时种群增长速率为正值。

- A. t_1 时种群增长速率最大
- B. **A** 种群在 t_2 和 t_3 时增长速率为零
- C. t_4 和 t_5 时种群增长速率为零
- D. t_1 和 t_5 时种群数量达到环境容纳量 K









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1

11

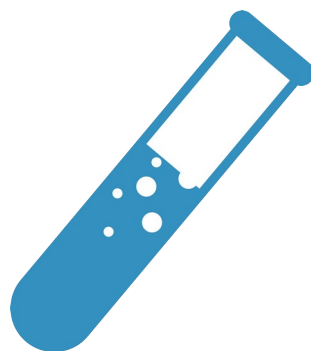
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2



□ □ □ □ □ □ □ □ □ □



3

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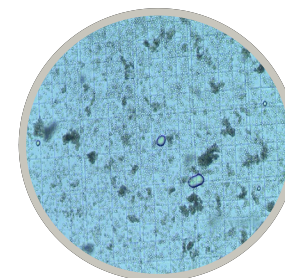
□□□□□ 28°C □□
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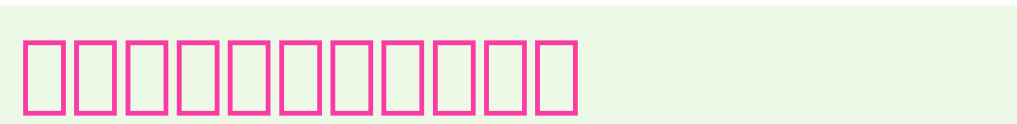
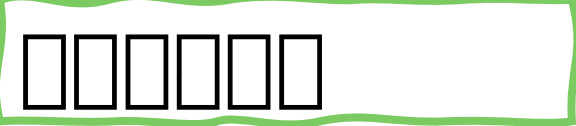


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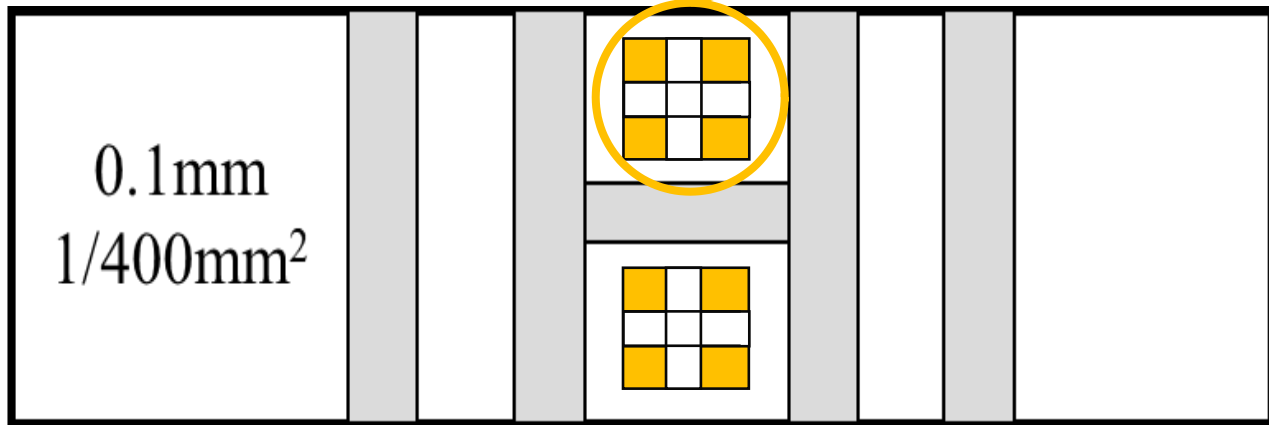






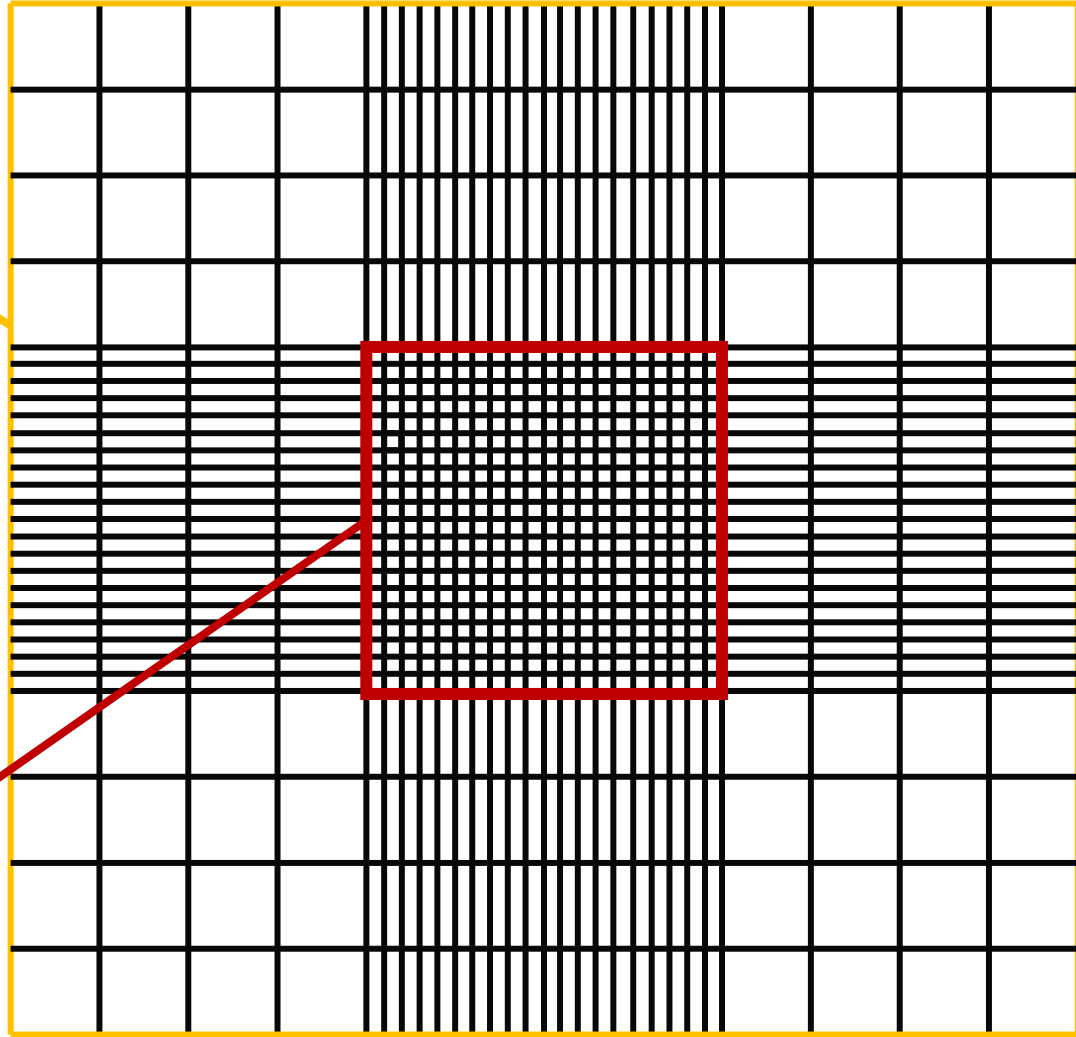
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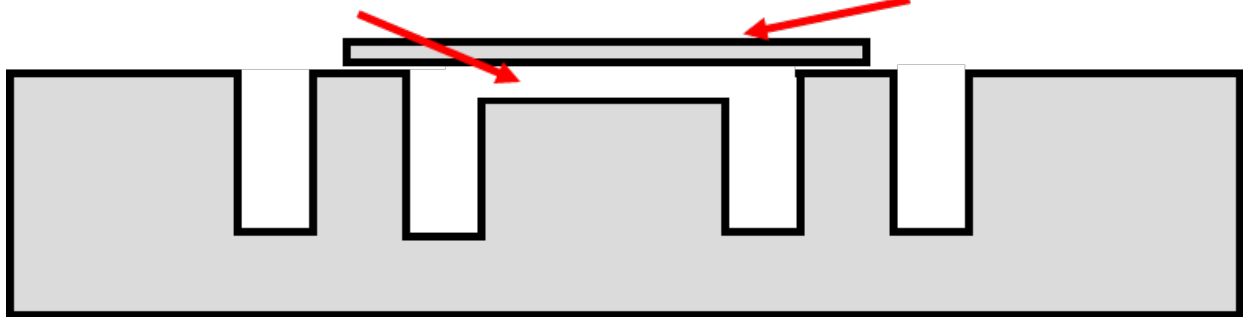
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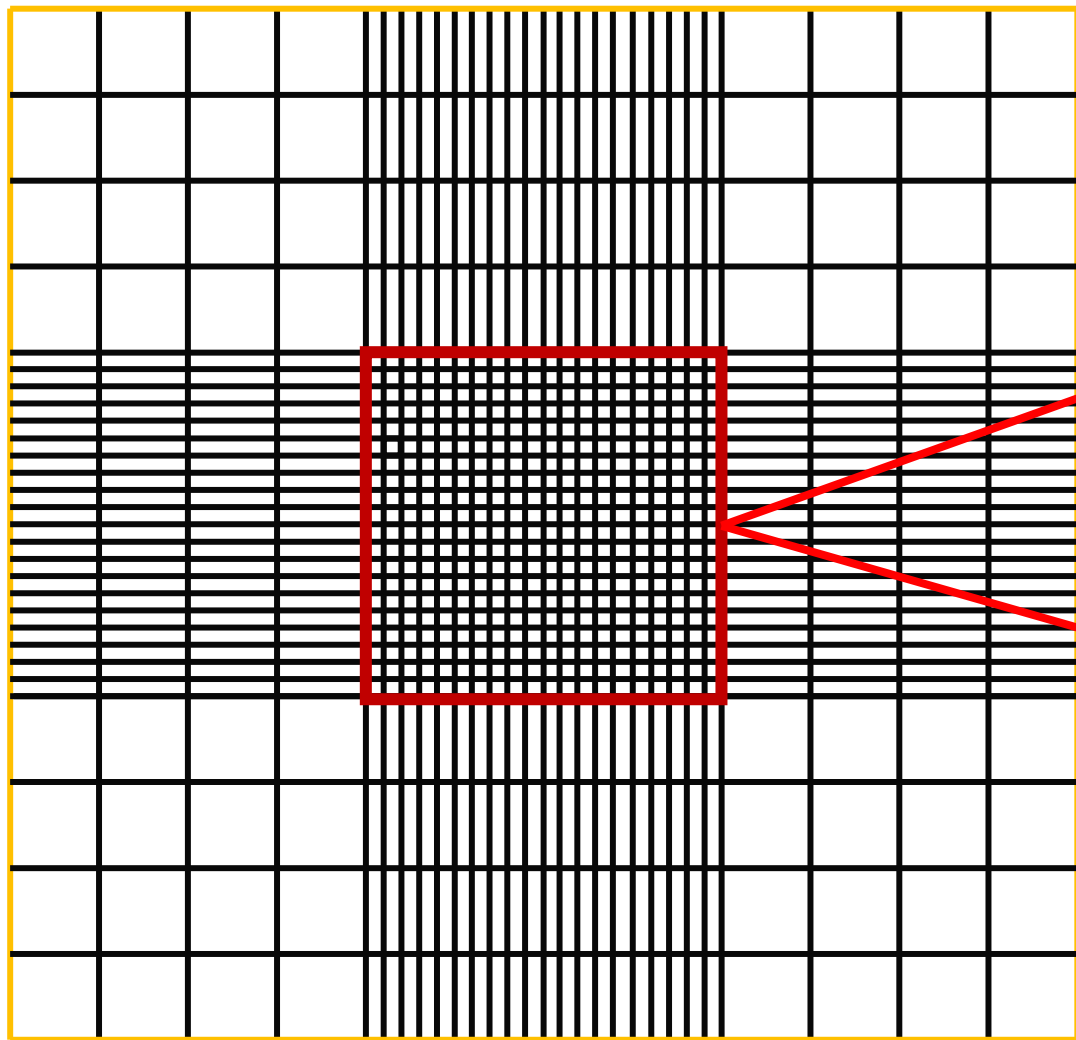
计数室-0.1mm

盖玻片



□□□□□

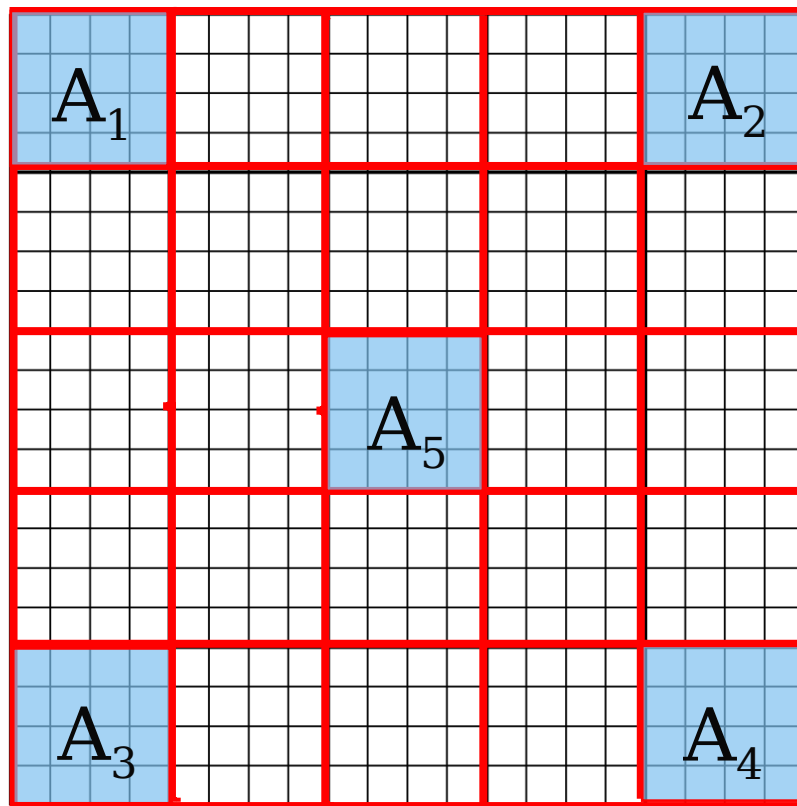
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9 □□□□

□□□□ **25×16** □

□□ **400** □□□□

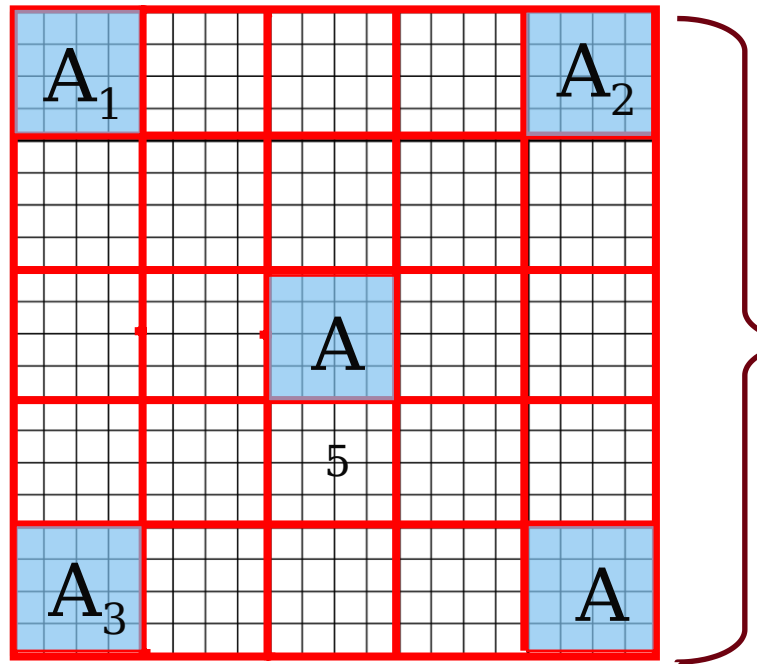


25 □□□□

□□□□□□ **16** □□□□



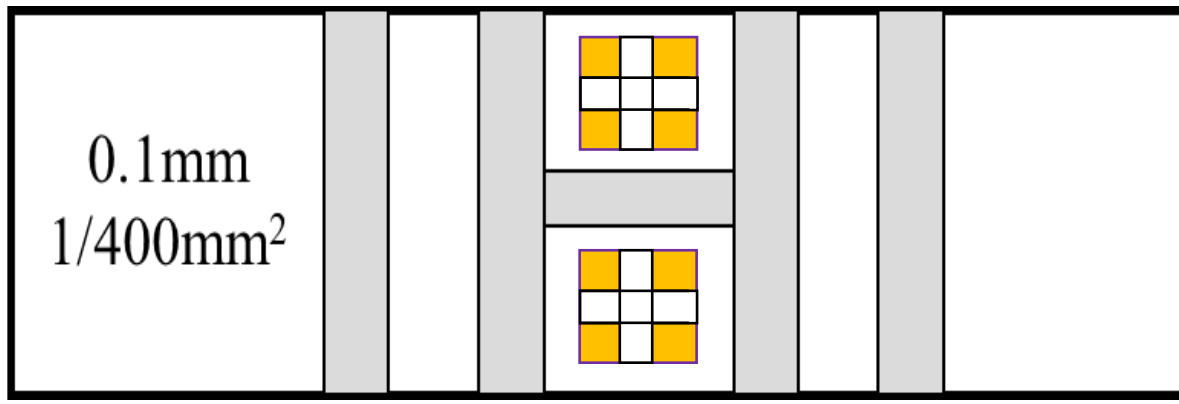
25×16 □



1mm ① **1/400mm²** □□□

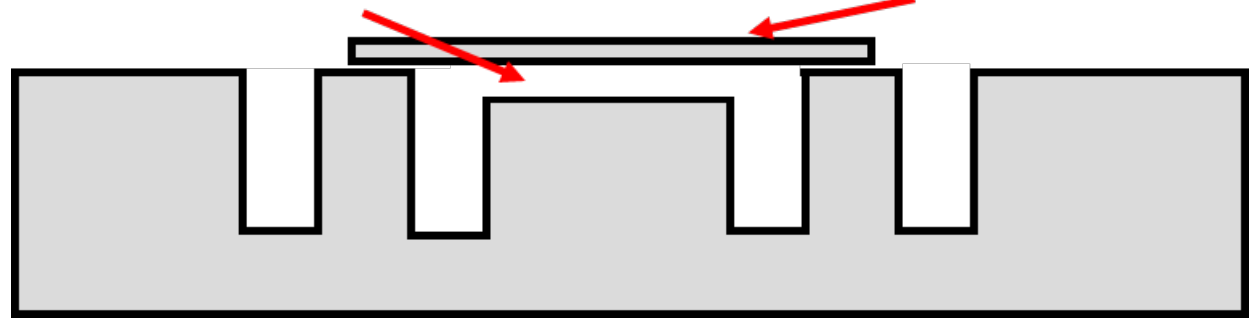
1 □□□□□□□□ 1mm² □ 1 □□□□□□□□ 400 □

□□□□□□□□□□□□□□□□ 1/400mm²



计数室-0.1mm

盖玻片

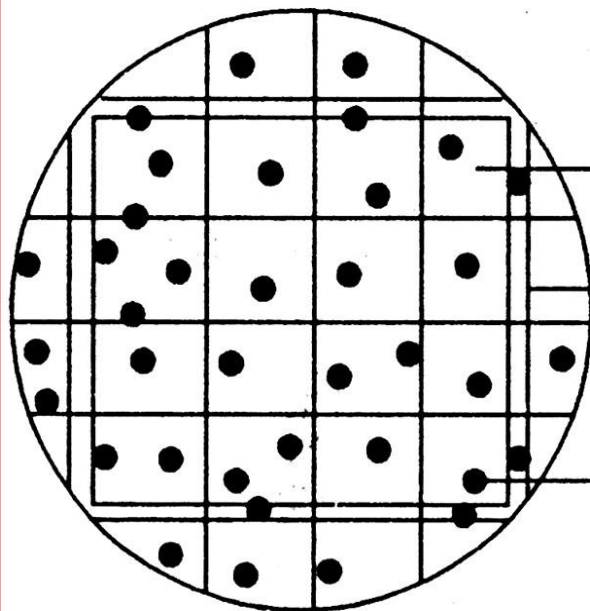
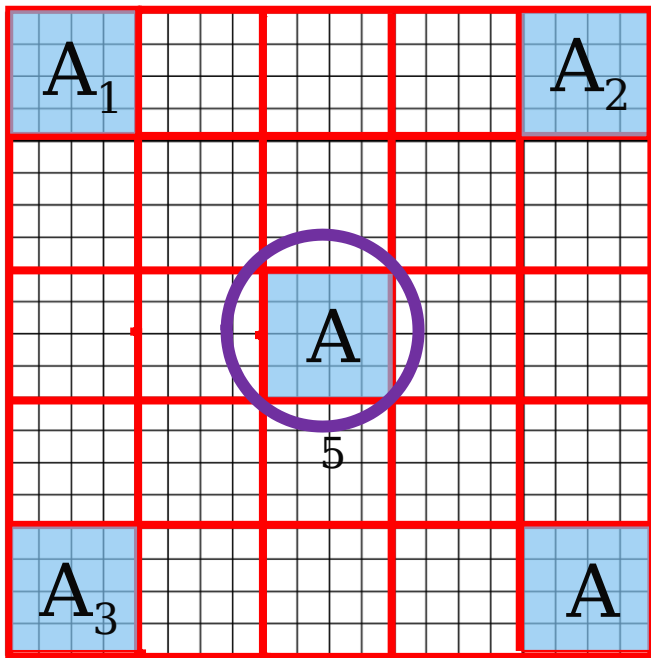
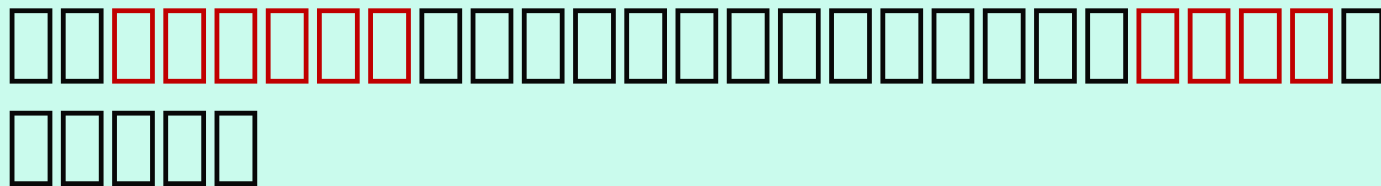


② **0.10mm** □□□

□□□□□□□□ 0.1mm

□□□□□□□□□□□□□□ **400** □□□□□□

□□ **0.1mm³** □



小格

中格(双线边)

酵母细胞

4

1mL

$$1\text{mL} = 10^3 \text{ mm}^3$$

$$\frac{X}{1\text{mL}} = \frac{\text{} \times 400}{0.1\text{mm}^3(10^{-4}\text{mL})}$$

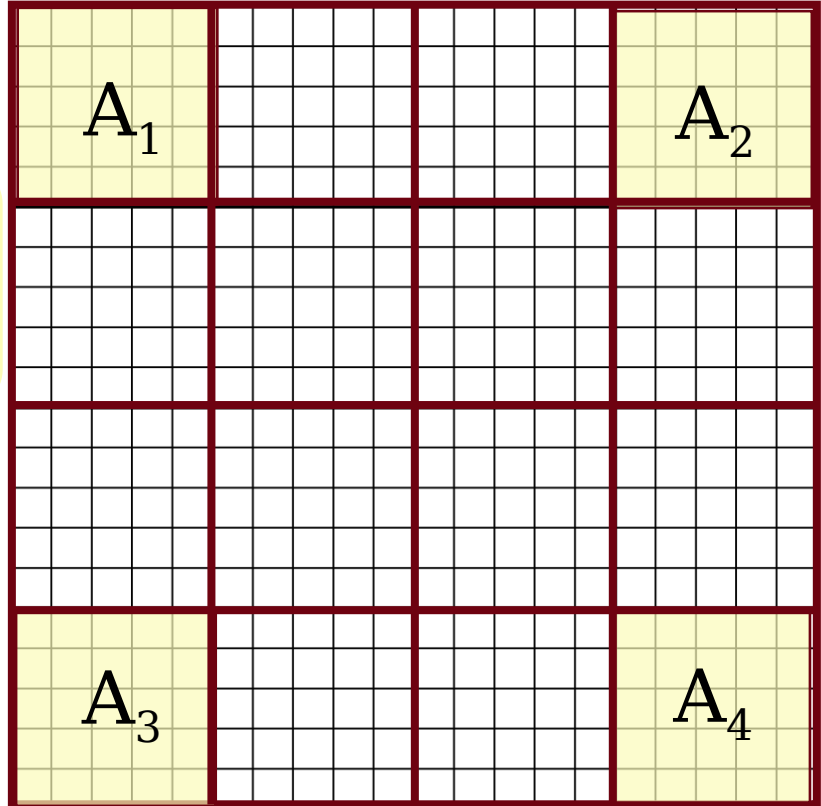
$$X = \text{} \times 400 \times 10^4 \times \text{}$$



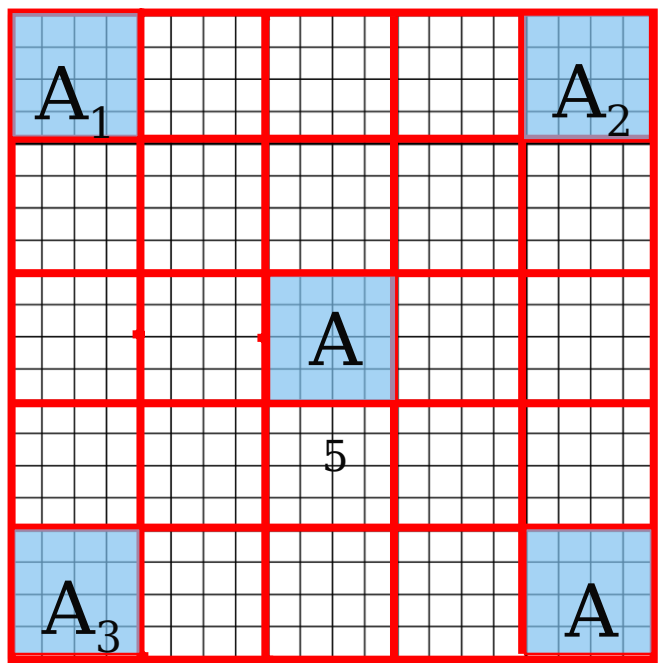
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□□□□□□ a

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(a/100) × 400 × 10⁴ × □□□□



□□□□ 25×16 □



□□□□ 16×25 □

□□□□□□□□ 5 □□□□□□ 80 □□□□□□□□
□□□□□ a

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(a/80) × 400 × 10⁴ × □□□□



01 OPTION

[illegible]

02 OPTION

03 OPTION



The diagram consists of two rows of boxes. The top row contains 20 boxes, and the bottom row contains 15 boxes. The boxes are colored red or blue. The top row has 12 red boxes and 8 blue boxes. The bottom row has 10 red boxes and 5 blue boxes.

1. □□□□□□□□□□□□□□□□□□□□□□
□□□□□□□□□□□□□□□□

The diagram consists of two horizontal rows of rectangular boxes. The top row contains 15 boxes in total; the first 10 boxes have black outlines, and the last 5 boxes have red outlines. The bottom row contains 8 boxes in total; the first 5 boxes have red outlines, and the last 3 boxes have black outlines.

2. □□□□□□□□□□□□□□

The diagram shows a 32-bit register represented by 32 small squares. The first 7 squares on the left are connected by a blue line, representing the ALU result. Below these 7 squares are 7 more squares, representing the data from memory. The remaining 25 squares of the register are empty.

3. □□□□□□□□□□□□□□□□□□□□

[illegible]

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4. □□□□□□□□□□□□□□□□

□□□□□□□ (□□□□□□□□□□) □□□□□□□

□□

5. □□□□□□□□□□□□□□□□□□□□

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6. □□□□□□□□□□□□□□□□

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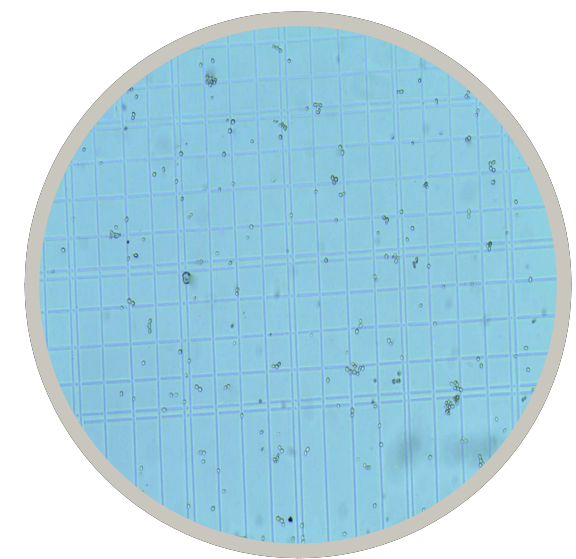
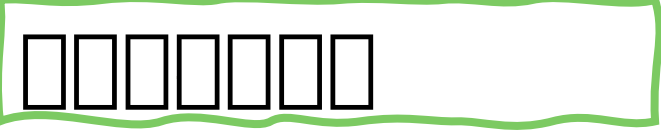
7. □□□□□□□□ ? □□□□□□□□□□□□□□□□
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[illegible]

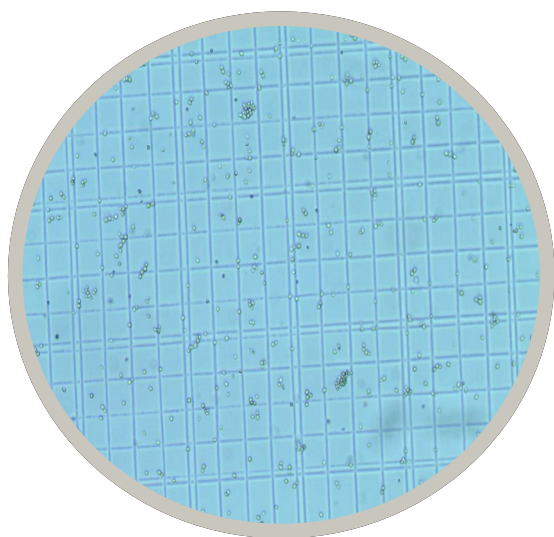
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8. □□□□□□□□□□ ?

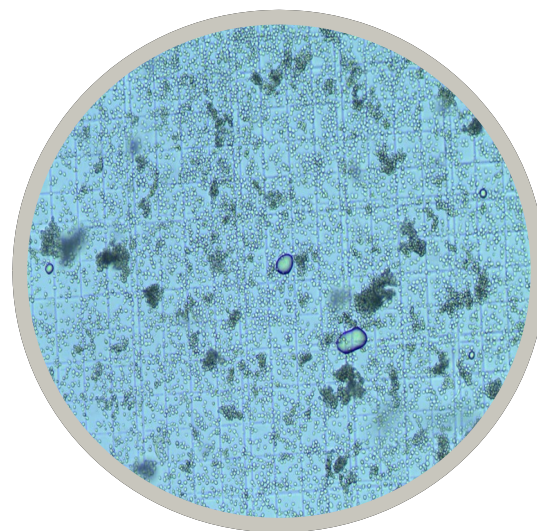
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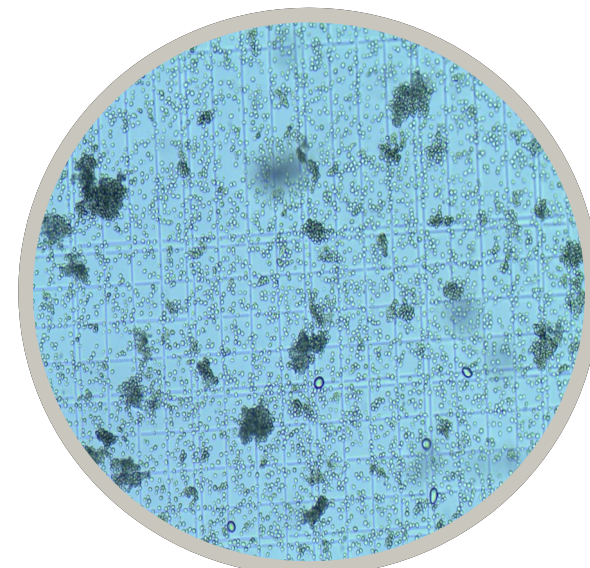
1



3



6



7

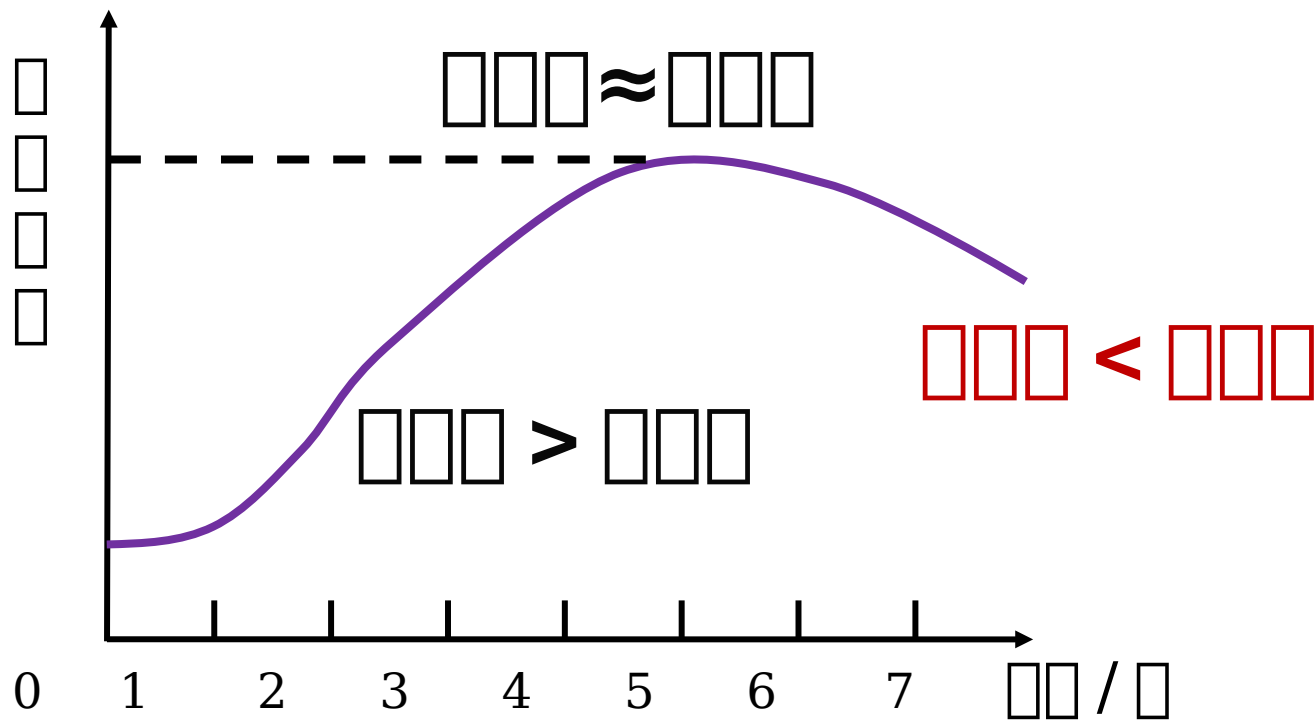




7

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① □□□□□□□□

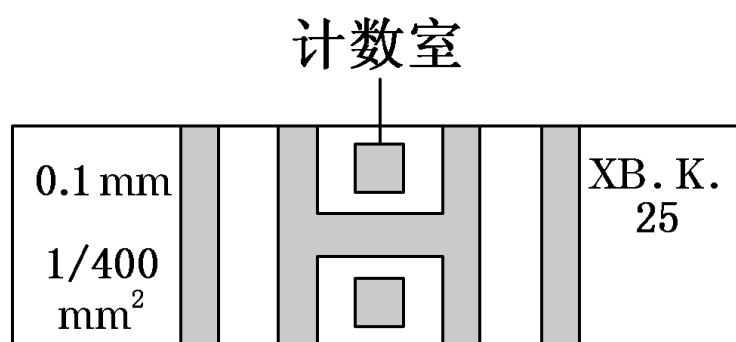
② □□□□□□□□

③ **pH** □□

□□□□□□□□

□□□□□□ □□□□□□□□ “**S**” □□□□

□□□□□□□□ : □□□□□□□□ **K/2** □□□□□□□□



血细胞计数板正面

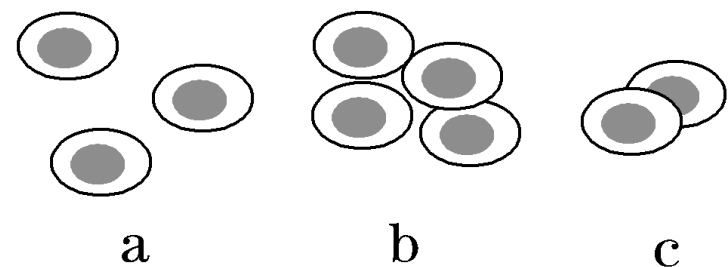


图 2 细胞分散情况

1. Introduction

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[illegible]

□□□□□□□□ 2 □□□□□□□□□□□□□□ ()

A.  2  1 mm

B. $\frac{1}{2} \text{ c } \frac{1}{2} \text{ c}$

[illegible]

C. $\square\square\square\square$ 1 $\square\square\square\square\square\square$ 16 $\square\square\square\square\square$ 4 $\square\square\square\square\square\square\square\square\square\square$

[illegible]

D. □□□□□□□□□□□□□□□□□□□□ (□□□) □□□

B



□□□□□□□□ 5 □□□□□□□□ 250 □□□□□□□□ ()

B. □□□□□□□□□□□□□□□□□□□□□□
□□□□□□□

[illegible]

D. □□□□ 7 □□□□□□□□□□□□□□□□
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